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# TROPICAL DISEASES BULLETIN

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BUREAU OF HYGIENE AND TROPICAL DISEASES.

# TROPICAL DISEASES BULLETIN.

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## SUMMARY OF RECENT ABSTRACTS.*

### III. MALARIA.

[*Continued from p.* 167.]

*Treatment.*

*Combined drugs*—COVELL (p. 750) points out that the Fourth General Report of the Malaria Commission of the Health Organisation of the League of Nations advocated short courses of treatment, with moderate dosage, for primary attacks and relapses of malaria. These are usually sufficient and are said not to interfere unduly with the acquisition of immunity, whereas prolonged administration of drugs when the disease is latent does no good, and may be harmful.

Military operations are taking place to an increasing extent in countries in which malaria is endemic, and the loss of the quinine supplies of Java has made it necessary to revise standards of treatment. WEED (p. 361) gives details of courses of treatment advocated by the National Research Council of the United States. He gives the revised composition of totaquine, of which more use is to be made. The combined QAP treatment is the method of choice and comprises quinine (or totaquine) for 2–3 days, atebrin for 5 days and, after a 2-day pause, plasmoquine for 5 days. Alternatives are given. For suppressive treatment atebrin is given on 2 days (not consecutive) each week.

BARBER (p. 822) has used the following treatment for men of the United States Navy in a heavily infected area :—Quinine 45 grains daily for 3 days ; then 30 grains daily for 7 days, on the last 2 of which some atebrin was also taken ; then atebrin 0·3 gm. daily for 5 days ; finally quinine 15 grains daily for 2 weeks. After this the patients reverted to prophylactic doses of atebrin.

The following combined treatment is advocated by the Medical Department, Tanganyika Territory (p. 879), as probably the most effective in *P. falciparum* infections :—quinine 20–30 grains daily for 2–3 days ; then mepacrine 0·2–0·3 gm. daily for 5 days ; then, after a pause of 5 days, the mepacrine course may be repeated. Mepacrine alone, or

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1943, v. 40. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

quinine alone, may be used, but in all cases short courses are recommended. Injections may be called for in severe attacks.

WINGFIELD (p. 518) gives vigorous treatment to patients seen in England. Most of these are seamen suffering from *P. falciparum* infections contracted in West Africa. He gives mepacrine 0·3 gm. and quinine 10 grains daily for a week, then quinine 10 grains daily for a week; then for a week the first week's treatment is repeated. If crescents are then found, pamaquin is used. He has found intramuscular quinine dramatically successful in seriously ill patients. All patients received adequate doses of iron. He (p. 821) has also used with success the following treatment for *P. falciparum* infections. Two intramuscular injections of solvochin daily for 4 days; then mepacrine 0·3 gm. daily for 7 days; then, after a short interval, pamaquin 0·03 gm. daily for 3 days.

*Quinine.*—HAMILTON (p. 750), writing from experience in the Netherlands East Indies, expresses marked preference for quinine over the synthetic drugs. The treatment he advocates is 15 grains of quinine daily for a week; for prophylaxis [suppressive treatment] he gives 10 grains of quinine on each of two successive days each week.

BOYD (p. 751) makes the point that artificially induced *P. vivax* infections are usually eradicated by quite small doses of quinine, but that this does not apply to artificially induced *P. falciparum* infections.

In *Science* (p. 290) there is a note on the new standards for totaquine which have been adopted in the United States; these will render the treatment more uniform and will allow fuller use of South American barks. At a recent conference on tropical disease the general opinion was expressed that totaquine is equal to quinine in the treatment of malaria.

TOMMASO (p. 880) reports from Ethiopia five cases of *P. falciparum* malaria (in one of which *P. vivax* was also found) which showed unusual resistance to quinine.

PELNER and SASKIN (p. 290) report a case of toxic amaurosis which developed after a few moderate doses of quinine, and which cleared up dramatically after intravenous administration of sodium nitrite, leaving some residual contraction in the visual fields.

GLAZKO (p. 880) describes a method of detecting quinine in urine by the use of a reagent which contains $HgI_4K_2$. [In the abstract it is stated that "to 5 cc. of urine . . . 5 cc. of the reagent are added." This is incorrect; it should read:—"to 5 cc. of urine . . . 5 *drops* of the reagent are added.") BRODIE and UDENFRIEND (p. 821) have devised a simple method of estimating quinine in human plasma.

*Mepacrine.*—MURRAY and SHUTE (p. 821) insist that mepacrine is at least the equal of quinine in the treatment of *P. falciparum* malaria, and that 0·6 gm. is equivalent to 15–20 grains of quinine.

THOMPSON (p. 821), writing of West Africa, states that the routine treatment consists of mepacrine 0·6 gm. on the first day followed by daily doses of 0·3 gm.

STEPHENSON (p. 821) in the Sudan uses somewhat heavy doses of mepacrine:—First day 0·6 gm.; second and third days 0·4 gm. daily; fourth to sixth days (inclusive) 0·3 gm. daily. No toxic effects were seen, pyrexia was rapidly controlled and there is evidence that relapses were less common than with the lower doses usually recommended.

HAWKING (p. 823) has shown that when mepacrine methanesulphonate (atebrin musonate) is injected intramuscularly there is always

some necrosis of muscle, though considerably less extensive than that caused by quinine.

DEARBORN *et al.* (p. 823) have studied the accumulation and excretion of mepacrine in dogs; the paper cannot further be abstracted.

HÜHNE (p. 292) gives a list of changes which he claims are brought about in *P. falciparum* as a result of treatment with atebrin.

In the *Journal of the American Medical Association* (p. 582) is a note to the effect that the occurrence of mental symptoms after the use of atebrin is slight, and that the Surgeon General of the United States Army has ruled that quinine prophylaxis is to be used only if a man cannot tolerate atebrin.

AYALA and BRAVO (p. 751) discuss the psychoses which may follow the use of atepé (which contains atebrin and plasmoquine); such mental conditions are, however, rare.

*Gametocides.*—For the treatment of benign tertian malaria, as it is seen in Croatia, GEORGEVIC (p. 291) advocates atebrin in daily doses of 0·4 gm. If atebrin is not available he gives quinine along with salvarsan. Quino-plasmoquine is always given as an after-treatment. With the atebrin treatment relapses occur in 8 per cent., with the quinine-salvarsan treatment in 25 per cent. of cases. This author (p. 291) discusses larval (masked) malaria. The diagnosis is exceedingly difficult, being made largely by exclusion, and the only drug which is effective is said to be plasmoquine in association with quinine. This form is said to be seen in Croatia in winter; in spring it is apt to break out into an acute attack.

DRENOWSKY (p. 669) writes of satisfactory results obtained by the treatment of ambulant malarial patients with quinoplasmoquine in courses of 10 to 20 days, in doses equivalent to 3 or 4 tablets daily for an adult.

AGUILAR MEZA *et al.* (p. 292) give an account of methods of treatment and control employed in Guatemala, where infection with *P. falciparum* is common. Certuna has been used as a gametocide, and is apparently rather more effective than plasmoquine.

RAFFAELE and SANDICCHI (p. 218) describe the action of the Italian preparation Gamefar, which appears to be almost, if not quite, identical with plasmoquine.

*Other drugs.*—WHELEN and SHUTE (p. 752) write of the use of thiobismol in therapeutic *P. vivax* malaria. Given about the fourth day after the onset of the febrile attack, this drug produces a remission of 48 hours, which is followed by a regular tertian fever. YOUNG *et al.* (p. 881) have used thiobismol in induced *P. vivax* infections. It appears to act on half-grown parasites only, and is capable of converting quotidian to tertian fever. For termination of *P. vivax* infections an injection of thiobismol the day quinine is started subdues the fever more promptly than quinine alone. Thiobismol appears to have no action in *P. falciparum* infections.

In *Folha Medica* (p. 824) is a note on iodo-mercurate of manganese in combination with extract of spleen, which, in Brazil, is claimed to be satisfactory in the treatment of chronic malaria and in prophylaxis. [It will be remembered that adverse reports of this preparation have been given in India and Malaya.]

VIDELA (p. 13) advocates intravenous injection of 10 cc. of a 10 per cent. solution of calcium chloride, on alternate days to a total of 5 injections, in the treatment of chronic splenomegaly due to benign

tertian malaria, after the temperature has been controlled by quinine. He claims that this treatment is successful in reducing the splenic enlargement.

MOHR (p. 13) states that there is increased metabolism of vitamin C in malaria, and that this vitamin is important as an adjuvant to iron in the treatment of the anaemia which follows malaria.

### *Suppressive Treatment.*

For drug prophylaxis [suppressive treatment] BARBER (p. 822) advocates atebrin in the following doses :—0·05 gm. daily for 6 days each week, 0·1 gm. being taken on the 7th day. The total is therefore 0·4 gm. each week. [The part of the world is not stated, but infection is said to have been heavy.]

CODA (p. 518) uses a form of treatment in which, after the clinical attack is brought under control, the patient receives atebrin 0·3 gm. and plasmoquine 0·02 gm. once each week or twice each month. This suppressive treatment is claimed to prevent relapses and yet to allow the development of the state of premunition.

FAIN and BENTZ (p. 218) record 2 cases of haemoglobinuria in young African children in the Belgian Congo, after the administration of prophylactic quinine. Four other children had somewhat similar attacks. The children were not affected at the same time, and other untoward effects of quinine prophylaxis have not been recorded. *P. falciparum* malaria is hyperendemic in the area.

### *Control.*

RUSSELL (p. 882) discusses military malaria control. He refers to all the standard measures, which should be applied in military as in civil communities when conditions allow, but discusses at length the spray-killing of adult mosquitoes, and describes the Freon-Pyrethrum Aerosol much used by the United States Forces. He points out that many anti-malaria measures require the intelligent cooperation of the individual soldier. This aerosol (the Freon bomb) is described in the American periodical *Soap* (p. 882). It contains Pyrethrum concentrate dissolved in dichlorodifluoromethane, and the cloud from one bomb will kill all flies and mosquitoes in 100,000 cubic feet. It appears to be safe, and the mixture is non-inflammable.

RUSSELL *et al.* (p. 14) have successfully used a kerosene extract of Pyrethrum flowers, diluted with 3 or 7 times its volume of water, in the presence of an emulsifying agent, for spray-killing adult mosquitoes. The stronger emulsion was rather more effective than the weaker, but the results with each were very good, and the total cost was much less than that of the Pyrocide spray generally used in India. KNIPE and SITAPATHY (p. 116) have described the various types of apparatus used for the spray-killing of adult mosquitoes.

BOLTEN (p. 753) shows that malaria is a serious problem in the military forces stationed in Porto Rico, where *P. falciparum* is the common parasite and *A. albimanus* the important vector. Although antilarval measures have been instituted, the chief protection so far has been due to mosquito-proofing of barracks and spray-killing of adult mosquitoes in the protected quarters.

POGODINA and SOKOLOV (p. 15) report that alkaloidal mists derived from anabasine sulphate or anabasine base by evaporation are effective

in killing mosquitoes. Unpleasant odours are produced, but rapidly clear from buildings, and the mists are apparently harmless to rabbits and fowls, and to foodstuffs.

MARKOVICH (p. 519) states that in N. Russia the practice of spraying houses and cowsheds in summer with a 3 per cent. solution of soft soap (more effective if raw alcohol is added to the extent of 2 per cent.) causes considerable reduction in the numbers of *A. maculipennis*. PRENDEL (p. 521) states that insecticidal sprays containing ½ per cent. soft soap and 1 per cent. formalin, or ½ per cent. hard soap and 2 per cent. crude alcohol are very effective against *A. maculipennis* and other mosquitoes in Odessa, but produce too great humidity for use in human habitations. Sprays of Pyrethrum steeped in benzene, or of soft soap with 0·1 per cent. anabasine sulphate were very effective, and insecticides of Pyrethrum dust with wood ash, or a dust of 15 per cent. anabasine sulphate, were equally useful.

SHLENOVA (p. 520) points out that if control (by dusting) of larvae of *A. maculipennis* in the Moscow province is discontinued before the middle of September, there is considerable increase in the number of overwintering females. Adults should be systematically destroyed in cowsheds in spring; if this is done the subsequent collections of larvae are greatly reduced. He gives information on the habits of this mosquito.

COVELL (p. 752) has contributed a paper on the *desiderata* of anti-malaria organization in India. No adequate summary can be given, but the original should be consulted by those interested in the subject. He is an advocate of extensive spray-killing of adult mosquitoes with preparations of Pyrethrum.

RUSSELL *et al.* (p. 753) point out that malaria may retard agricultural development, but that although irrigation schemes may introduce or increase malaria, in general the more extensive and intensive the agricultural practice the less intense and extensive may malaria become. They describe the control measures taken in the Pattukkottai taluk, and note that spray-killing is an effective procedure which can be carried out for an overall cost of one-quarter of one rupee per head per year.

KNIPE and RUSSELL (p. 673) give an account of the antilarval control measures which have been employed in the Pattukkottai taluk, South India, in recent years. *A. culicifacies* is the vector, and breeds extensively as a result of an irrigation scheme inaugurated in 1933. The methods included filling and draining, control of channels, the use of Gambusia and Paris green, and intermittent irrigation; an additional aim was to raise the standard of living by securing better agriculture and improving other facilities. The results, estimated by spleen and parasite rates compared with those of a control area, have been very good. The total cost for 4 years was 6s. 6d. per head of population, but the maintenance cost after engineering work was completed was 2½d. per head for 1 year. RUSSELL *et al.* (p. 114) have investigated the possibility of controlling the breeding of this mosquito in rice fields by introducing the process of intermittent irrigation, and have found that a cycle of 5 wet days followed by 2–4 dry days is satisfactory for this purpose, except during the rainy season when the ground cannot be dried. *A. culicifacies*, however, does not breed actively in rice fields during the rains, nor does it do so when the plants have reached a height of a foot. Intermittent irrigation of this extent does not affect the yield of grain or straw. To carry it out effectively, supervision of the ryots would be necessary.

RAO (p. 113) in India has continued his experiments on the control of anophelines by stocking rice fields with sullage at weekly intervals from February to May. Rice is broadcast in June, when the monsoon sets in. Not more than one inch of sullage is allowed to flow in, and this is completely absorbed within 4 days. It was found that although the larval population of non-vector species was increased, that of vectors such as *A. annularis* and *A. aconitus* was substantially reduced. Moreover, the yield of rice was improved.

RAO (R. B.) and RAMOO (p. 115) have observed that in the Pattukkotai taluk the breeding of *A. culicifacies* is more intense in canals whose banks are free from shrubs than in those with dense marginal growth. These plants provide shade and mechanical obstruction to ovipositing females [it will be remembered that *A. culicifacies* hovers some inches above the water surface during the process of oviposition]. Two creepers are named which offer good prospects of reducing breeding if planted along canal banks.

THOMSON (p. 436) points out that when *A. minimus* is controlled by shade or by clean weeding, essentially the same thing is happening. Shade does not repel the female, but it kills the grass and so destroys the sheltered niches in which eggs would have been laid. Shading and removal of weeds operate, in streams, by increasing the rate of flow of the water.

SHANNON (p. 522) has written a brief account of the successful campaign against *A. gambiae* in Brazil. The eradication of this mosquito was due to: the topographical conditions, which were unfavourable to it, the presence of an organization capable of tackling the work, the biological habits of the mosquito, the use of Paris green and insecticidal sprays, and the failure of *A. gambiae* to escape to the wetter regions. SOPER and WILSON (p. 670) give a fuller account of this work, and also of the eradication of *Aëdes aegypti* from large areas of Brazil. For success in an eradication programme the aquatic and adult forms of the mosquito should be easily discoverable, the methods of destruction should be efficient, the area to be worked should be sufficiently large, or isolated, and there should be enough money and staff to do the work thoroughly—these are usually only available if the problem is serious.

HOPKINS (p. 671) has surveyed the subject of mosquito and malaria control, with special reference to East Africa, where *A. gambiae* and *A. funestus* are the vectors. The generally accepted antilarval methods are reviewed, but emphasis is laid upon wave action in the control of *A. gambiae* and *A. funestus* along the shores of Lake Victoria and a small lake. Papyrus and mud banks were cut away and a shore line of firm steep banks was constructed, which was exposed to the wave action of the lake water. The initial cost was fairly high, but upkeep has been very cheap, and breeding has almost been eliminated. He (p. 672) writes of the value of cotton-seed tar, a by-product produced by ginneries which use a producer-gas, as a substitute for larvicidal oils.

BLACKLOCK and WILSON (p. 358) describe simple methods for preventing the breeding of *A. gambiae* in small agricultural compounds in West Africa.

DAVID (p. 293) has found that by combining waste lubricating oil 10–30 per cent., kerosene 10–20 per cent. and diesel oil 60–75 per cent. a satisfactory larvicide oil, with good spreading pressure, film stability and toxicity, can be obtained. Waste oils, however, vary so much that satisfactory proportions can be found only by experiment. He

(p. 16) gives details of simple tests for estimating the suitability of mineral oils as mosquito larvicides; these cannot usefully be abstracted.

AFANASSIEV (p. 521) writes of the value of a distillate from coke stills as a larvicide. It kills larvae and pupae in an hour, but is relatively harmless to Gambusia.

RENN (p. 582) notes that the natural film which forms on undisturbed waters and which, if broken by wind, collects round the leeward edges of pools, may block the spread of larvicidal oils. These films should be broken by agitation of the water before oiling is done.

D'AMATO (p. 219) discusses the malaria control measures taken in the endemic malaria zone of North Argentina. Distribution of quinine and the use of oil and Paris green are mentioned.

HOWARD and ANDREWS (p. 16) have shown that when a mixture of Paris green and lime is blown either from hand blowers or from power dusters, the Paris green settles out at shorter distances than does the lime, and, therefore, that the extent of visible dust is greater (and may be much greater) than the extent of water actually receiving Paris green. It is therefore desirable to find a diluent whose density and behaviour in aerial suspension are more nearly akin than lime to those of Paris green.

KNIPE and RUSSELL (p. 115) have described automatic machines for the distribution of Paris green.

HINMAN *et al.* (p. 17) have experimented with the object of finding a cheaper and more effective arsenical larvicide than Paris green. Copper arsenite was found to be at least as effective as Paris green; it had a uniformly fine particle size, and the authors consider that particles of average size of 5–15 microns are more effective than those of 25 microns. MESSERLIN (p. 753) also states that calcium arsenite gives results equal to those given by Paris green; it is used in the same way, but with powdered marble as the diluent.

ROBERTSON *et al.* (p. 15) have contributed a paper on ditch linings, which cannot further be abstracted. ANDREWS *et al.* (p. 673) and LEGWEN and LENERT (p. 673) have also published papers on the technical aspects of ditch-lining in malaria control. LEGWEN and HOWARD (p. 674) describe a new automatic siphon.

SHAPKIN (p. 437) has studied the biology of *Gambusia affinis holbrooki* and *Leucaspius delineatus*, each of which may be used in the Ukraine for the control of mosquito larvae. RAO (R. B.) and RAMOO (p. 114) describe their experiences with larva-eating fish in the wells of Pattukkottai. The fish have many enemies, and their use is not simple.

### *Malaria of Monkeys and Birds.*

RODHAIN (p. 438) discusses the malaria parasites of apes. *P. reichenowi* is not regarded as identical with *P. falciparum*, and the evidence, though conflicting, suggests that *P. schwetzi* is not identical with *P. vivax*. *P. rodhaini*, however, is probably identical with *P. malariae*, and recent experiments, which he describes, have tended to confirm this view.

RODHAIN and LASSMAN (p. 119) have found that the cycle of development of *P. schwetzi* of the chimpanzee (which closely resembles, and has, in fact, been claimed to be, *P. vivax*) lasts 48 hours. An experiment indicated, however, that the parasite was not easily transmitted by *A. maculipennis* var. *atroparvus*, and that such oöcysts as were found were larger than those of *P. vivax*.

WENDEL (p. 674) has studied the respiratory and carbohydrate metabolism of *P. knowlesi*. Oxygen is consumed and glucose destroyed by infected red cells *in vitro* with great rapidity, and about half the destroyed glucose is converted into lactic acid. Anaerobiosis stimulates glycolysis by the infected cells. Addition of glucose to the blood leads to a rapid fall of *p*H and a decline in oxygen consumption and glycolysis, but both metabolic processes cease at *p*H 5·5. Sulphanilamide is one of the substances which usually have no significant influence on the respiration or glycolysis of parasitized cells.

NIYOGI and ROY (p. 755) have cultivated *P. knowlesi* by a modified Bass and Johns method; cultures kept at 24°C. were infective for 4 days, those kept at 37°C. for 2 days only.

For the complement fixation reaction, RAY *et al.* (p. 118) advocate treating blood (infected with *P. knowlesi*) with a haemolysin prepared against the red cells. This removes all traces of the cells from the parasites, which can then be washed and centrifuged. Other methods of preparing antigens are also discussed.

FULTON and YORKE (p. 754) succeeded in rendering a strain of *P. knowlesi* resistant to plasmoquine during passage through 8 monkeys. They then maintained this strain for 5½ months in another monkey, and found that it was still considerably resistant to plasmoquine. This resistance, therefore, has some degree of stability.

RIGDON and STRATMAN-THOMAS (p. 118) have studied the pathology of *P. knowlesi* infection of monkeys. Certain changes are similar to those which occur in human beings dying of severe anaemia: dilatation of the heart, oedema of the lungs, necrosis of central hepatic cells, parenchymatous degeneration of the kidneys. The authors suggest that the severity of the anaemia (with consequent anoxaemia), the intensity of the infection, and the rapidity with which the disease progresses are responsible for these effects.

NIYOGI (p. 755) notes that injection of a suspension of *P. knowlesi* in phenol-saline into monkeys suffering from chronic homologous infection will reduce the number of parasites in the blood. This effect is not seen in acute infections.

TRAGER (pp. 676, 825) reports observations which showed that ducks infected with *P. lophurae* when they were in a condition of biotin deficiency experienced more severe malaria than controls, and that biotin deficiency induced markedly increased susceptibility to *P. cathemerium* infections. Administration of biotin to deficient birds lessened the severity of *P. lophurae* infections, but did not influence those in normal birds. Biotin in the plasma is raised during the infection, and it appears that biotin is mobilized in the blood from the tissues and may show activity by reducing the number of parasites. The fact that plasma biotin in chickens infected with *P. lophurae* rises more rapidly and to a greater height than in ducks may provide the explanation of the fact that chickens at a certain age get rid of their infections more quickly. It may be that biotin is an essential growth factor for the parasites, with a certain optimal range of concentration, but more work must be done before this can certainly be claimed. The author states that marked deficiency of pantothenate had no comparable effect.

HEWITT (p. 222) has made a detailed study of the host-parasite relationships of untreated infections with *P. lophurae* in ducks. The mass of information cannot be given in an abstract, but the work is most valuable as a basis for the study of malaria parasites and of the

effects of drugs. It has not hitherto been possible to demonstrate exoerythrocytic forms of *P. lophurae*, which is an advantage in certain chemotherapeutic experiments.

As a result of a very large number of observations on giant white Peking ducks infected with *P. lophurae*, HEWITT *et al.* (p. 439) have found that for the qualitative testing of anti-malarial drugs, standard conditions of infection can be obtained by using ducks 2 weeks old inoculated with 2 billion [2,000 million] parasites per kgm. body weight, the parasites having been taken from a duck on the 4th or 5th day after infection. The peak of infection is reached on the 4th to 7th day. For quantitative tests ducks 6 weeks old, which produce the most uniform infections, are preferable. MARSHALL *et al.* (p. 223) have been able so to standardize infection of ducks with *P. lophurae* that they have effectively compared the therapeutic activity of a number of sulphonamides with that of quinine. Means were devised by which the blood concentration of the drugs was kept fairly constant; the drugs were incorporated in food, which was taken every three hours. On the sixth day, in controls, 85 per cent. of red cells are infected; when quinine is given the figure is less than 1, and the sulphonamides gave figures varying from 2 to 5 or more. This paper should be studied by all persons working on similar problems.

In tests on ducks infected with *P. lophurae*, SEELER *et al.* (p. 879) found that quinine, quinidine, cinchonine and cinchonidine were about equally active, and that two samples of totaquine, differing widely in quinine content, were as active as quinine alone.

SEELER *et al.* (p. 756) have shown that sulphamethyldiazine given to ducks infected with *P. lophurae*, at the time of inoculation and for 10 days after, produced a mild infection compared with that experienced by controls, and that *p*-aminobenzoic acid is capable of neutralizing the action completely.

MARSHALL (p. 223) has prepared a review of the literature of chemotherapy in avian malaria which should be studied by all those who contemplate work of the same kind.

HURLBUT and HEWITT (p. 583) have successfully transmitted *P. lophurae* by *A. quadrimaculatus*.

TRAGER (p. 675) has studied the survival of *P. lophurae in vitro*. Blood from infected ducks was maintained in a medium to which various growth factors were added. The parasite was maintained alive for about 2 weeks.

MUDROW (p. 116) has observed the stages of development of *P. gallinaceum* after injection of sporozoites. Rounded uninucleate extracellular forms are found after 24 hours, at the site of injection; binucleate forms are seen after 48 hours, some within mononuclear cells; at 96 hours multinucleate forms, and groups of 16 merozoites, are present, but up to this time no parasites could be found in red cells. Drugs were tested for their effects on the endothelial stages; plasmoquine alone was useful in reducing death rates and the number of endothelial forms.

DEVINE and FULTON (p. 440) have examined the pigment produced by *P. gallinaceum*; spectroscopic and chemical investigations showed it to be haematin. The pigment produced by *P. knowlesi* is also haematin.

RUSSELL *et al.* (p. 117) have found that, in fowls inoculated with an antigen derived from the ground-up thoraces of mosquitoes infected with *P. gallinaceum*, agglutinins active against homologous sporozoites

are formed and may reach a titre of 1/32,000. Such fowls show some resistance to infection by mosquito bite, but none against injected trophozoites. RUSSELL and MOHAN (p. 362) have produced immunity in fowls by repeatedly injecting inactivated sporozoites of *P. gallinaceum* or serum from normal sheep or chronically infected fowls. The best results were obtained by injecting emulsions of dried thoraces of infected mosquitoes along with serum. Injection of normal sheep serum, or that of chronically infected fowls, greatly increases the size of the spleen. It is suggested that, in the process of immunity, both cellular and humoral agencies are concerned.

MENON *et al.* (p. 220) report on the results of a number of experiments on *P. gallinaceum.* Many points are briefly touched upon, and the reports cannot further be abstracted.

CORRADETTI (p. 117) reiterates his argument that exoerythrocytic schizonts are not derived exclusively from sporozoites, but may develop from inoculated erythrocytic forms. He regards them not as stages of a separate cycle of development, but as representing biological characters of the species in which they occur. They are found in several species of bird malaria parasite, and in *P. elongatum* development takes place in red cells and in blood-forming cells, but not in histiocytes. It is unjustifiable to assume that exoerythrocytic forms of human parasites exist, and more so to suggest that they are responsible for relapses.

MISSIROLI (p. 221) states his view that the early development of sporozoites takes place extracellularly in the lymph spaces of the tissues, and not within histiocytes.

PORTER (p. 221) has investigated the development of exoerythrocytic schizonts of *P. cathemerium* and *P. relictum.* In many strains these forms were not observed, but in two they appeared after sporozoite infection. In the early stage they were found in liver, spleen and bone marrow; later they were abundant throughout the body in endothelium and capillaries and in collections of macrophages. He suggests two processes:—one of development from sporozoites, with appearance in liver, spleen and marrow, the other of development from erythrocytic schizonts whose merozoites enter endothelial cells in all organs.

BOYD and GILKERSON (p. 221) have found that in canaries with latent infection with *P. cathemerium* there is a process which hinders but does not prevent multiplication of subsequently injected trophozoites.

GINGRICH and FILLMORE (p. 439) have found acranil, a yellow dye, to be as effective as atebrin in *P. cathemerium* infections in canaries. Its action is similar to that of atebrin, but it is excreted more quickly. The effective dose is toxic to canaries, but the toxicity is largely overcome by administration in 5 per cent. solution of gelatin.

HILL (p. 293) considers that the immediate cause of death in pigeons infected with *P. relictum* is the anaemia due to loss of red cells.

BISHOP (p. 583) has noted great variations in the number of gametocytes found in canaries infected with *P. relictum.* After the peak of infection has been passed there is a fall in the number of asexual parasites and also in gametocytes, which indicates that gametocyte production is not a response to the development of immunity.

PURCHASE (p. 363) describes a species of Plasmodium found in turkeys in Kenya.

MANWELL (p. 756) has shown that strains of bird malaria parasites rapidly frozen to −65° to −78°C., and kept at about these temperatures, may remain viable for as long as 212 days. *Charles Wilcocks.*

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## MALARIA.

WINTERBOTHAM, L. P. & ARDEN, F. **Two Cases of Benign Tertian Malaria in Civilians.** *Med. J. Australia.* 1943, Aug. 14, v. 2, No. 7, 129–30.

The two patients were boys aged 13 and 5, both residents of Brisbane; the attacks were apparently typical except that, after a period of feverishness [probably representing the initial continued fever characteristic of primary infections] the true rigors occurred every day, without tertian periodicity. *Plasmodium vivax* was found in each case, and the authors surmise that the quotidian fever was the result of multiple infection. Each boy lived within a short distance of an army hospital or convalescent depot and the brother of one of them, home from Timor, had suffered from malaria.

There is strong presumptive evidence that local mosquitoes conveyed the infection in both cases from convalescent soldiers. [The implication is that there is a very real danger of spread of malaria in this way during and after the war. Brisbane is very much farther south than the limits of any recorded outbreak since 1900 (see CILENTO, *Tropical Diseases in Australasia*, 2nd edit., 1942, p. 4); *Anopheles annulipes*, a breeder in permanent and sunlit water, and a proved carrier of *P. vivax*, is found as far south as Tasmania (*ibid.*, p. 411).] *Charles Wilcocks.*

SHUTE, P. G. **Successful Transmission of Human Malaria with Sporozoites which have not come into Contact with the Salivary Glands of the Insect Host.** *J. Trop. Med. & Hyg.* 1943, Oct.-Nov., v. 46, No. 5, 57–8.

Various views have been held regarding the maturation of malarial sporozoites. Some observers have found that sporozoites from salivary glands are not always infective, and have concluded that they become infective only after maturation in the glands. Others have held that the sporozoites in the glands are infective, but those within or just escaping from oöcysts are not so. In SCHAUDINN's famous experiment, not yet confirmed, he stated that he had observed the penetration of red blood corpuscles by sporozoites of *Plasmodium vivax* obtained from ripe oöcysts on the stomach of the mosquito. In the paper under review the author states that at the Malaria Therapy Centre of Horton Hospital during the past few years 110 patients have been inoculated with sporozoites from the salivary glands of mosquitoes, and 12 with sporozoites from oöcysts. Of the former all became infected, but of the latter only 5. To ensure that there was no admixture of gland sporozoites with those from the oöcysts, the following procedure was adopted. Infected mosquitoes were incubated up to the time when gland infections would be commencing. A mosquito was then dissected by first withdrawing its glands. If these were not infected, the stomach was then removed. If ripe

rupturing oöcysts were present, the fluid on the slide was taken into a syringe and injected intravenously. It was safe to conclude that in such a case only sporozoites from oöcysts had been injected. As noted above, in 5 of 12 such experiments infection occurred. Amongst these were cases of *P. vivax*, *P. falciparum* and *P. ovale* infections.

*C. M. Wenyon.*

ROSS, E. S. & ROBERTS, H. R. **Mosquito Atlas. Part II. Eighteen Old World Anophelines important to Malaria.** pp. II. iv+44, numerous illustrations. 1943. Sept. 22. Philadelphia: American Entomological Society, Academy of Natural Sciences.

The general plan of the atlas has been recently explained [this *Bulletin*, 1943, v. 40, 877]. It consists of drawings, executed on a uniform plan, of adults and larvae of selected species of mosquitoes.

The present part covers eighteen major vectors of malaria in the Old World. The reviewer hopes that illustrations of more species, from both hemispheres, may yet be published. The plan and execution seem excellent, but there is a danger in selecting certain species, and in not calling attention to others, closely similar in anatomy but widely different in relation to malaria. The book is intended for use by the isolated worker in the field. Suppose he catches an Anopheles in Bengal which is very like the *A. minimus* of the illustration, how can he know whether he has taken another species (perhaps of no medical importance), or a specimen exhibiting some minor variation from the normal?

The part concludes with a list of Old World species of Anopheles, with important synonyms, brief remarks on geographical distribution, and an indication of relation to malaria.

*P. A. Buxton.*

OLZSCHA, R. Mitteilung ueber das Vorkommen von *Anopheles maculipennis* im Warthegau, mit Angabe einer einfachen Methode der Blutfütterung von Mücken bei ihrer Haltung in Einzelhaft. [**The Occurrence of *A. maculipennis* in the Posen Area: A Simple Method of feeding Mosquitoes with Blood.**] *Zent. f. Bakt.* I. Abt. Orig. 1943, June 15, v. 150, No. 4, 215–17.

The paper gives the results of a survey of *Anopheles maculipennis* in the "Warthegau." [This is one of the *Gaue* of Greater Germany, and consists, with minor additions, of the Polish province of Posen. A malaria survey has become necessary as a preliminary to settlement by Germans.] Collections were made widely in the Gau, and practically all the females which laid eggs were shown to belong to variety *messeae*.

Collections were made in winter. The female mosquitoes were brought into a warm room and fed on pigs' blood diluted with half the volume of water, sugar being added. They sucked this up from cotton wool moistened by the diluted blood. It is not stated what proportion would lay eggs on sugar and water alone.

*P. A. Buxton.*

BRITISH MED. J. 1943, Dec. 4, 718–19. **Malaria Control in Freetown Harbour.**

In this editorial note it is pointed out that malaria in Freetown, in peace time, had been considerably reduced by the measures taken by the health authorities, but that with the great use made of the

harbour during this war, ships have been compelled to anchor at places usually avoided, with the result that malaria has been more marked than in peace time in the crews. The subject has been, and is being, investigated, and one result of importance which has come to light as a result of the work of Muirhead THOMSON is that it is now known that *Anopheles gambiae* var. *melas*, the important vector, not only breeds in mangrove swamps, but does so in association with one form of mangrove only. This form grows in limited clumps or orchards, and can be eliminated. *Charles Wilcocks.*

VAN SOMEREN, G. R. C. **Notes on the Mosquitos of British Somaliland.** *Bull. Entom. Res.* 1943, Dec., v. 34, Pt. 4, 323–8.

The paper deals with small collections made in parts of British Somaliland at several different times of year. The total number of species of mosquito known to occur is 22, among them *Anopheles gambiae*, which was common, though not previously recorded.

The author describes common types of breeding place, and lists the localities at which the species were recorded. *Anopheles d'thali* is very common in the larval stage, and a previous record of *rhodesiensis* may well refer to this species. *A. turkhudi* was collected, but not *cinereus*. *Aëdes aegypti* was common, and taken as high as 4,700 feet, where *A. vittatus* also occurred. *P. A. Buxton.*

SINTON, J. A. **The Diagnosis of Malarial Infections.** *Monthly Bull. Ministry of Health & Emergency Pub. Health Lab. Service (directed by Med. Res. Council).* 1944, Jan., v. 3, 2–7.

A brief and lucid account which medical men called upon to deal with malaria would do well to study. *Charles Wilcocks.*

TAREJEV, E. M., GONTAYEVA, A. A. & ROTENBURG, S. S. [**Fulminating Type of Tertian Malaria.**] *Sovietskaja Medicina.* [=*Soviet Medicine.*] 1943, No. 4, 12–14. [In Russian.]

This is a further contribution to the question of the fulminating form of tertian malaria due to *P. vivax* [see also this *Bulletin*, 1943, v. 40, 436, 668]. Working in central Russia (in 1941) the authors have observed among children and youths varying in age from 4 to 17 years but mainly between 6 and 12, a peculiar condition, with grave symptoms, terminating fatally after a few hours. In most cases the local physicians failed to associate the severe clinical picture with malaria but attributed the disease to an infection of the nervous system of unknown origin.

The present observations have shown that the cerebral manifestations occurred during the second or even first regular paroxysm of the tertian type. As a rule, on the day before the severe attack the children would feel quite well and have a normal appetite. Sometimes they even went to school in the morning of the day when the attack took place. The paroxysm of fever generally started suddenly, with a rapid development of unusual symptoms (very severe headache, shrieks, vomiting, convulsions, foam at the mouth; loss of consciousness, Cheyne-Stokes respiration), terminating in death 2–3 hours later. It was rarely possible to examine the patients carefully during their life. In 12 out of 17 cases the examination of blood films (*ante et post mortem*)

revealed *P. vivax*. However, contrary to what is found in the comatose form of subtertian malaria, only single parasites were seen in the cerebral capillaries.

After describing the anatomico-pathological findings the authors conclude that death in their cases was due to anoxia of the brain accompanied by the cessation of its fundamental functions owing to cerebral swelling. There was no evidence of the action of specific toxins upon the brain. This fulminating form of tertian malaria is attributed to the individual reactions of the host rather than to any peculiarity of the strain of plasmodium.

Prognosis is very grave but in some cases the injection of a full dose of quinine or acriquine [atebrin] immediately the cerebral symptoms had manifested themselves saved the lives of the children. It is, therefore, suggested that such cases should be treated as promptly as possible on mere suspicion of malaria. *C. A. Hoare.*

KEKHCHER, O. M. [**On Protracted Cases of Malaria, according to Materials of the Batum Central Tropical Station.**] *Med. Parasit. & Parasitic Dis.* Moscow. 1942, v. 11, No. 6, 36–7. [In Russian.]

In a number of recent Russian works [this *Bulletin*, 1943, v. 40, 345] it has been demonstrated that the duration of acute cases of malaria does not usually exceed one year. This was also confirmed by the author in the Adjar Republic (Caucasus).

In this locality, which was formerly a hyperendemic area of malaria, intensive antimalarial measures carried out recently have considerably reduced the incidence of infection. Thus in 1940 the parasite-index was 0·5 per cent.; among 11,264 children only 23 harboured parasites (0·2 per cent.); and the introduction of new groups of non-immune persons did not result in an increase of cases of malaria, while the number of new infections amounted to 187 in 1939 and 176 in 1940.

These data would seem to indicate that the malaria situation in Adjaria was highly satisfactory. Nevertheless, the number of malaria cases registered every year continued to be very high, a fact which appeared to contradict the above conclusions. However, an examination of the records for the preceding five years showed that only in a small proportion (10 to 20 per cent.) of the cases attributed to malaria was the diagnosis confirmed by the finding of the parasites, the condition in the majority of patients being registered as "chronic malaria" without objective evidence.

The examination of over 300 of such patients confirmed the impression that they were not suffering from malaria at all, though they themselves attributed all their ailments to this disease. It is pointed out that such cases of pseudo-chronic malaria are highly misleading and they should be excluded from local records, otherwise they tend to give an erroneous picture of the epidemiological situation and may affect the planning of anti-malarial campaigns. *C. A. Hoare.*

HELDT, T. J. & GODER, G. A. **Agranulocytosis following Malarial Therapy in General Paresis.** *J. Nervous & Mental Dis.* 1943, Sept., v. 98, No. 3, 248–54.

Agranulocytosis as a complication of malarial therapy has not hitherto been reported in English medical literature; four such cases have, however, been described in German medical journals. The present

case is that of a male aged 45 suffering from dementia paralytica. On September 24th he received an intravenous injection of blood from another patient undergoing malaria therapy with *P. vivax*. On the 28th he had a chill with a temperature of 104·5°F. During the following 2 weeks he had 12 chills with, in all, 48 hours of fever above 104·5°F. On October 14th the temperature rose to only 103°F. so on the following day, when the temperature again rose, an intravenous injection of 25 million killed typhoid organisms was given, with a subsequent rise of temperature to 106°F. On the 18th the temperature reached 106·2° and 20 grains of quinine were given in two doses. The fever did not subside. The patient died on the 19th. On admission to hospital a blood count revealed 9,400 white blood cells per cmm., of which 62 per cent. were polymorphonuclear. On the day of his death leucocytes numbered only 750, of which 90 per cent. were large lymphocytes, 2 per cent. small lymphocytes and 8 per cent. monocytes. Clinical conditions and post-mortem findings are described at some length. [The thesis that malaria was responsible for the agranulocytosis does not appear to rest on very solid foundations.]

*Norman White.*

DE ZULUETA, J. Esquizogonia del *Plasmodium falciparum* en la circulación periferica. [**Schizogony of *P. falciparum* in the Peripheral Circulation.**] *Rev. Facul. de Med.* Bogotá. 1943, May, v. 11, No. 11, 650–64, 4 figs. on 1 pl. [23 refs.]

Of 164 cases of malignant tertian malarial infection studied in Bogotá, schizonts were seen in the peripheral blood in 2·4 per cent. of the cases. All were typical of *P. falciparum* infections, and they all responded readily to antimalarial treatment. There was no indication that the cases with schizonts in the peripheral blood were of special severity, as is the usual claim for such cases in other districts. The author believes that there exist certain strains of *P. falciparum* which reproduce normally by schizogony in the peripheral blood, and that in Colombia such forms are of more frequent occurrence and of less grave significance than they are elsewhere.

*C. M. Wenyon.*

SNEDDON, I. B. **A Fatal Case of Cerebral Malaria.** *Brit. Med. J.* 1943, Dec. 25, 814–15.

A stoker from a warship was admitted to a naval hospital in a semi-comatose condition. He had suffered from severe headache for three days but had not reported sick as he wanted to go on leave. His ship had been at Sierra Leone two weeks before he fell ill, a fact which was unknown to the hospital authorities. The possibility of a meningococcal infection prompted the immediate administration of 1 gm. sulphapyridine intramuscularly. Subsequent investigation revealed the presence of numerous ring forms of *P. falciparum* in the peripheral blood. There was a moderate leucocytosis with a raised monocyte count. There was no neck rigidity, no positive Kernig's sign and no paralysis of the limbs. The pupils were pin-point; there was incontinence of urine. An intravenous 5 per cent. glucose-saline drip was given. Into the rubber tubing of the drip apparatus was injected slowly, with a hypodermic syringe, a solution containing 10 grains of quinine dihydrochloride and 10 min. of 1/1000 adrenaline hydrochloride in 20 cc. of water. The following day the condition was

much improved but there was persistent vomiting. Another injection of 10 grains of quinine dihydrochloride was given in the same manner as before. On the 3rd day the temperature rose to 104°F. and the patient relapsed into coma. The quinine treatment was again repeated and 10 cc. of clear fluid were removed by lumbar puncture. The patient died on the 5th day. Post-mortem findings were characteristic of cerebral malaria; there were numerous petechial haemorrhages throughout the brain, most numerous in the cerebral hemispheres.

*Norman White.*

CAMERON, I. G. **Cerebral Malaria.** [Correspondence.] *Brit. Med. J.* 1944, Jan. 22, 127–8.

Cameron refers to the patient reported by SNEDDON [above] who died after having received several intravenous injections of quinine. Cameron stresses the importance of not sparing quinine, and advocates, in such cases, two or even three intramuscular injections of 15 grains daily. Two or three injections usually suffice, but if vomiting or coma persist, the injections must be continued until these signs disappear; the largest number he has given to any individual patient is 14 injections over a period of seven days. In an experience lasting 14 years in a part of Malaya where cerebral malaria was common and where the strain of *P. falciparum* was "infinitely more virulent in this respect than the West African," very few cases were lost. He has never seen untoward results or abscesses, but insists, of course, on absolute sterility and the need to ensure that the injection is, in fact, made into muscle. Energetic treatment, with injection of at least 30 grains daily, would greatly reduce the number of fatal cases.

He points out that in cerebral malaria parasites may be very scanty in the peripheral blood.

*Charles Wilcocks.*

i. BURTON, A. F. & KELSEY, F. E. **Studies on Antimalarial Drugs. The Metabolism of Quinine in Pregnant Animals.** *J. Pharm. & Exper. Therap.* 1943, Sept., v. 79, No. 1, 70–76, 3 figs. [19 refs.]

ii. KELSEY, F. E. & OLDHAM, Frances K. **Studies on Antimalarial Drugs. The Distribution of Quinine Oxidase in Animal Tissues.** *Ibid.*, 77–80.

iii. OLDHAM, Frances K. & KELSEY, F. E. **Studies on Antimalarial Drugs. The Influence of Pregnancy on the Quinine Oxidase of Rabbit Liver.** *Ibid.*, 81–4.

i. SADLER, DILLING and GEMMELL [this *Bulletin*, 1931, v. 28, 848] and others have shown that quinine, when given to induce labour, is found in foetal tissues in doses capable of toxic effects. The present investigation deals with the metabolism of quinine, in the maternal rabbit and foetus during the whole course of pregnancy, after intravenous or oral administration to the mother. The animals were sacrificed one hour or longer after receiving the drug and the quinine content of tissues was estimated by the method of KELSEY and GEILING (*J. Pharm. & Exper. Therap.*, 1942, v. 75, 183).

In the foetus the concentration of quinine was highest at the 12th day, dropped gradually till the 23rd day and then increased till term at the 31st day. When pregnancy was prolonged by Gonadogen there was a diminution in quinine content of post-term foetuses. The amount of quinine in the tissues decreased rapidly as the interval between

administration and estimation was increased. The foetal portion of the placenta contained more of the alkaloid than the maternal portion and the former, by storing quinine or impeding its passage, affords some protection to the foetus.

In the mother the lowest concentration of quinine in the tissues was found at the end of the second " trimester " [20th day] and there was a rise in concentration as term approached, indicating a loss of ability to destroy the drug. In the rabbit tissue-values were low compared with those in other animals. This was specially true of the liver, which is very effective in destroying quinine. The maternal tissues were shown to contain quinine after injection into the foetus. It appears that the liver of the non-pregnant rabbit is better able to destroy the drug than that of the pregnant rabbit. The above results may have marked significance for man.

ii. It is well known that certain animal tissues destroy quinine *in vitro* [see LIPKIN, this *Bulletin*, 1920, v. 15, 127]. The metabolic product has not been identified, nor is it certain whether it or the parent alkaloid is the active agent in malaria.

Quantitative studies have been made by the authors on the distribution, in various animal tissues, of the agent responsible for the breakdown of quinine. Since oxygen is known to be essential for this reaction they have termed the substance quinine oxidase and preliminary work suggests that the metabolite is in fact an oxidation product. The fresh tissues were macerated in Ringer-Locke solution, strained through muslin, and incubated with known amounts of quinine for various periods at 37°C. The quinine then present was estimated. Rabbit liver was more active in the destruction of quinine than that of other laboratory animals. Human liver was comparatively inactive. There was a great variation in the activity of the other tissues examined. The disappearance of quinine administered to the living animal is correlated with the amount of quinine oxidase in the tissues.

iii. The effects of pregnancy on the activity of quinine oxidase of rabbit liver *in vitro*, and the time of its appearance in the foetus, have been investigated. Livers of rabbits from the 20th day of pregnancy till the 42nd day after delivery, as well as those of non-pregnant animals, were obtained fresh and incubated with quinine as described above. Foetal and young rabbit livers were used in the same way.

It was found that quinine was destroyed by the liver more slowly in late pregnancy and early in the post-partum period than in control animals. The organ had regained normal activity 42 days after delivery. Loss of activity appears to be due to lack of quinine oxidase rather than to some inhibitory mechanism. The results for normal animals were very constant. The enzyme is present shortly after birth and maximum activity is reached at the time of weaning. In severe parasitic infections of livers the oxidase activity was reduced.

*J. D. Fulton.*

KIRZON, M. I. [**Treatment of Malaria in the (Russian) Army.**] *Sovietskaja Medicina.* [=*Soviet Medicine.*] 1943, No. 4, 14–15. [In Russian.]

In the autumn of 1942 there was a considerable increase of admissions for malaria in a certain military zone of U.S.S.R. Although the majority were cases of benign tertian malaria (as established by blood examination) the symptoms were mostly like those of subtertian (stupor, coma).

The author found that the most effective treatment was by intramuscular injection of acriquine [atebrin]. This was introduced either in doses of 12 cc. of a 2·5 per cent. solution of the powdered hydrochloride or in doses of 10 cc. of a 3 per cent. solution of the tablets (each dose containing 0·3 gm. pure acriquine). In the latter case the tablets were dissolved in water heated to 70°C. and filtered twice through 3–4 layers of gauze. The resulting transparent solution was sterilized and its concentration was determined colorimetrically (by comparison with a solution of powdered acriquine of desired concentration).

As a rule, one or two injections were sufficient to suppress the paroxysms of fever but, as an extra precaution, the treatment was continued for two or three days longer, the whole course consisting of 3–5 injections spread over the same number of days.

This treatment proved to be highly successful in all cases (more than 200), including comatose forms (13). It also compared favourably with the oral method of administration of acriquine in that (1) the period of treatment is reduced (on the average 3·2 days as compared with 4·35 in the latter), and (2) the cure is more lasting (only 2 cases relapsed).

In a number of cases beneficial results were obtained by blood transfusion, accompanied by administration of 0·1 gm. acriquine three times daily, immediately after suppression of the malarial attacks. This treatment invariably brought about 15–20 per cent. increase of haemoglobin and a marked improvement in the general condition of the patients. *C. A. Hoare.*

SCUDI, J. V. & HAMLIN, Margaret T. **Distribution and Excretion of Atabrine in Experimental Animals.** *Proc. Soc. Exper. Biol. & Med.* 1943, Oct., v. 54, No. 1, 127–31.

The concentration of mepacrine (atabrine) was determined by a modification of Hecht's procedure [for details, see original, see also HECHT, this *Bulletin*, 1936, v. 34, 157]. It is claimed that concentrations between 1 and 10 gamma per cc. could be measured within instrumental error. The results were multiplied by correction factors of 1·09 to 1·3 according to the results of control estimations on the various tissues concerned. The figures include various degradation products of mepacrine (presumably inactive therapeutically) which were not distinguished from unchanged mepacrine by the method used. When rats were given a single oral dose of 225 mgm. per kgm., the blood concentration was maximal at half an hour (1·3 mgm. per 100 cc.) and after six hours it fell to 0·3 mgm. per 100 cc. When a dog was given 100 mgm. per kgm. by mouth, the concentration in the blood was 0·26–0·50 mgm. per 100 cc. over the period ½ to 24 hours. A group of rats was given an oral dose of 225 mgm. per kgm.; after 1 day, the liver contained 0·6–1·2 mgm. mepacrine per gm. of wet tissue, and the spleen 0·15–0·2 mgm. per gm.; after 14 days, the liver contained 0·1–0·7 mgm. per gm. and the spleen 0·1–0·2 mgm. per gm. In rats which received 12 daily doses of 45 mgm. per kgm., the liver often showed necrotic areas. The daily output of mepacrine in the urine (after 225 mgm. per kgm.) was small, ranging from 0·45 to 0·99 mgm. on the first day and 0·24 mgm. on the 13th day. The urinary output was not proportional to the dose administered. A monkey was given 7 doses of 300 mgm. per kgm. by stomach tube during a three-week period, and was then killed;

the concentration of mepacrine in the organs was—liver 1·4 mgm. per gm. wet tissue, kidney 0·23 mgm., small intestine and brain each 0·1 mgm., muscle and lung each 0·30 mgm. per gm. When a dog was given four doses of 200 mgm. per kgm. by mouth within 1 week, the faeces contained about 22–31 mgm. per day mepacrine for 4 days after the last dose.

[Since the authors' method did not distinguish mepacrine from inactive degradation products, the figures represent maximum values; the dimensions of the minimum values are unknown. In view of this, only an illustrative (but incomplete) reproduction of the data has been attempted, and the original paper should be consulted by those interested.] *F. Hawking.*

SCUDI, J. V. & HAMLIN, Margaret. **Effect of Atabrine on the Urinary Porphyrin Output in the Rat.** *Proc. Soc. Exper. Biol. & Med.* 1943, Oct., v. 54, No. 1, 132–4, 1 chart.

Daily oral administration of toxic doses of mepacrine to rats does not produce an increased output of coproporphyrin in the urine.

*F. Hawking.*

WILSON, D. Bagster & MELVILLE, A. R. **The Control of Malaria. East African Command, 1940–1943.** *J. Roy. Army Med. Corps.* 1943, Nov. & Dec., v. 81, Nos. 5 & 6, 213–22; 263–8.

Troops of the East African Command have served in places which extend over half the length of Africa and consequently the risk of malaria to which they have been exposed has varied greatly. Some areas are free from malaria; these include parts of the central African highlands of Kenya, a large part of central Ethiopia, and smaller areas of Tanganyika and Madagascar. In these places the low temperature associated with high altitudes inhibits transmission. A large part of North Kenya and the greater part of Somalia are so hot and dry that anopheline breeding is limited to the neighbourhood of permanent rivers or seasonal streams. At the other extreme malaria transmission continues throughout the greater part of the year, on the east coast of Tanganyika, of Kenya and of Madagascar as well as in most of Uganda and central Tanganyika. Between these two extremes seasonal malaria occurs in Northern Rhodesia and in the Rift Valley of Central Ethiopia. The anti-malarial organization of the Command has therefore had to deal with a very great variety of conditions. The very high measure of success achieved endows with special interest the authors' description of the control measures employed.

Much of the control work has been carried out by Mobile Malaria Sections consisting of African labour and semi-skilled Africans and Europeans. Educated Africans are given a three to four months' course of preliminary training and then become Malaria Assistants. The best of these can be trained eventually to carry out simple surveys and to run simple controls without immediate European supervision. European N.C.O's. have done good work. Those with good general education learn sufficient about the practice of anopheline control, identification of Anopheles and field surveys to make them useful members of units within a period of weeks. After experience in the preliminary stages of the East African campaign the standard of surveys made by the Mobile Malaria Units has been high.

There have been but few examples of high malaria rates among first line troops in forward areas; the temporary absence of a local infective population possibly explains this, for only very partial protection can be afforded such troops. Settling down near to water and native villages has sometimes produced severe malaria. "Since the anti-malarial organization has become adequate in size, it has hardly ever been found impossible to reduce European malaria incidence [in more permanent camps] within a few weeks to less than 100 per cent. per annum."

Emphasis is laid on the importance of "malaria mindedness" among all ranks. Some units have only learnt the importance of this by bitter experience. Good siting of camps is the most important single anti-malaria measure. Even in the worst areas there are parts which are less bad. Half a mile, and whenever possible one mile, from obvious main anopheline breeding places are regarded as minimal distances, with a similar avoidance of native villages. The site should be reasonably well sloped and camp construction should avoid interference with natural drainage. Track discipline is important; rain-filled car tracks can produce enormous numbers of *A. gambiae.*

Personal protection, including the use of protective clothing during hours of darkness and the proper care and use of the mosquito net are the first line of defence. This is a matter of unit discipline. There was a striking difference in Madagascar between the malaria incidence of freshly arrived United Kingdom troops and of Europeans of East Africa units camped on the same site. There was difficulty at first in obtaining mosquito netting of sufficiently small mesh to exclude *A. funestus.* A rectangular net 72 by 30 by 40 inches has been found suitable. In a bivouac the corners of the net are tied to sticks cut from the bush and stuck in the ground. Little use has been made of repellents. Where regular night duty is involved the employment of the minimum number of men is essential. Head nets are rarely effective in practice.

Pyrethrum spraying of adult mosquitoes is an essential measure of military malaria control and is always practicable. An evening spraying at dusk, with an early morning spraying in specially malarious areas, is recommended. In bivouacs such mosquito shelters as vehicles, boxes, bundles of bedding, treeholes and patches of dense bush near sleeping places require attention. An example is given of a camp in which personal protection combined with the killing of adult mosquitoes reduced malaria rates by at least two-thirds.

Anti-larval measures have been more employed in static camps than in forward areas, but such measures are now regarded as a routine in almost any circumstances with the resulting assurance that the control of malaria can be achieved in most unpromising conditions. The larvicide used has been one part of solar oil to 10 parts of diesel fuel oil. When control is urgent oiling is commenced at once over as large an area as possible pending the completion of a survey, intensive anti-adult measures being also carried out from the start. Simple drainage may often reduce the areas of water to be oiled. Rapid clearing of *A. funestus* breeding places may result in a remarkable diminution of the prevalence of this species. The efficacy of antilarval work is always controlled by weekly adult catches.

Suppressive treatment has been little used. "An estimated malaria rate of 10 per cent. per month has been adopted as a very

rough criterion for the necessity of imposing suppressive treatment and on only isolated occasions has control by other methods been so ineffective that the necessity has arisen."

The report contains statistical information regarding the incidence of malaria in different areas which bears testimony to the success achieved by the Malaria Control Organization of the East African Command. The last conclusion of a remarkable report reads : " There is no royal road to the control of malaria in war but, by the application of all anti-mosquito measures to the maximum extent possible under the particular circumstances prevailing, it has proved possible to reduce malaria to a level at which it does not cripple the efficiency of units without the use of suppressive treatment." *Norman White.*

ZUMPT, F. Der Flugzeugeinsatz in der medizinischen Schädlingsbekämpfung. [**The Aeroplane in Mosquito Control.**] *Deut. Tropenmed Ztschr.* 1943, July 1, v. 47, No. 13/14, 360–68. [Numerous refs.]

In an introductory summary the author states that the aeroplane was first used in anti-mosquito work for surveying by MÜHLENS in Thrace in 1917 and by HEWITT in Canada in 1919. As a means of scattering Paris green (copper acetoarsenite) over breeding places of Anopheles it was used first in the United States of America in 1923, then in Northern Italy in 1927 [MISSIROLI, this *Bulletin*, 1928, v. 25, 155], in Russia in 1928, and in Portugal in 1932 [FIGUEIRA & LANDEIRO, *ibid.*, 1933, v. 30, 497]. It was used in Madagascar in 1932 and in Morocco in 1934, in Indo-China in 1935 [MORIN & MARTIN, *ibid.*, 1934, v. 31, 469], and in India in 1937 [COVELL & AFRIDI, *ibid.*, 1937, v. 34, 638]. In Germany it was used against forest pests in 1924 but not in antimalaria work ; in 1941; however, it became necessary when the German troops occupied the eastern and south-eastern malarious districts of Europe, and a number of aeroplanes were therefore sent to Greece, Serbia and the Ukraine.

Several factors have to be considered when using this method of scattering Paris green over Anopheles breeding places : the particles should not be more than 30$\mu$ in diameter to enable the first-stage larvae to ingest them ; street dust, as a diluent of the poison, is heavy, and talc was found to be the best of several other substances tried (wood ash, slaked lime, kieselguhr, &c.) owing to its lightness. The toxicity of the poison used, the thickness of the vegetation, the susceptibility of valuable plants, *e.g.*, rice, have to be taken into consideration. The kind of scattering mechanism and the speed of the aeroplane affect the quantities required. Generally about 1 kgm. of pure Paris green per hectare (2½ acres) of surface is used, but as little as 200 gm., or as much as 2 kgm., may be needed. For rice fields, in order to avoid damaging the plants, a mixture containing from 1 to 5 per cent. of the poison is suitable, but for ordinary use the dilution has generally been about 1 : 3. When calcium arsenite and sodium arsenite were tried it was found that 3–4 times the amount was required.

Oiling from an aeroplane is costly and only effective where there is little vertical vegetation (bushes, reeds &c.) ; the usual amount is about 200 litres per hectare. It was used with good results in New Jersey in 1932.

Early in 1942 the author was sent to conduct antimalarial work in the Ukraine and used aeroplanes around Kherson near the mouth of

the River Dnieper [this *Bulletin*, 1944, v. 41, 4]. Two aeroplanes were supplied, one being fitted to spray liquids and the other to scatter dust; they had two engines and could reach a speed of 180 km. per hour; one carried 1,000 litres of liquid and the other 1,500 kgm. of dust. The oil-spraying machine was used only 3 times and was found unsuitable as the bushes were too thick, but the other machine proved to be very effective. A wagon load of calcium arsenite and some tons of Paris green, belonging to the Russians, were used. Laboratory tests with calcium arsenite, made by Weyer in Hamburg in 1941/42, had shown that Anopheles larvae of the 4th stage were killed in 30 minutes, nearly all younger larvae in 2½ hours, and some culicine larvae after 5 hours, pupae surviving.

A suitable diluting material had to be selected. The scattering apparatus of the aeroplane was easily damaged by coarse street dust which was also too heavy, so, until a fine sieve and new apparatus could be fitted, and as the matter was urgent, the author tried pure calcium arsenite. This left the aeroplane as a thick cloud which slowly spread, as it sank, to a breadth of 150–250 metres, of which about 30–40 metres were effective. About 1,500 hectares were thus treated. After a new sieve had been fitted he tried a mixture of 1 part of Paris green and 20 parts of street dust; the cloud was not so broad as with pure calcium arsenite and, with a load of 1,500 kgm. only about 15 hectares could be covered, an average of 100 kgm. per hectare or about 4·5 kgm. of Paris green per hectare. This is a very large amount; with a lighter diluting material many times this area could have been treated with a less concentrated mixture.

From this experience, this type of machine will use in future only very light diluting materials such as talc; the least amount of mixture distributed per hectare will be about 20 kgm. With Paris green about 18–19 parts of diluting material will be required, and perhaps about 15 parts for calcium arsenite.

The author concludes with a reference to the possible use of the aeroplane against other pests; the breeding places of culicine mosquitoes (especially those of Aëdes in North and Central Europe and in North America) are suggested but they are somewhat thickly covered with vegetation. Another suggestion is to use it to destroy tsetse flies in the savannah country of Africa; in the dry season the author thinks that a poisonous powder scattered as a cloud might kill the flies by direct contact and thus solve the tsetse problem in such areas.

*J. F. Corson.*

HURLBUT, H. S. **Observations on the Use of Sea Water in the Control of *Anopheles albimanus* Wied.** *J. Parasitology.* 1943, Oct., v. 29, No. 5, 356–60.

The deliberate increase in salinity of coastal lagoons in the West Indies is used to eliminate breeding of *Anopheles albimanus*. The author's experiments and observations tend to define the insect's upper limit of salinity.

If wild females are confined in specimen tubes with various dilutions of sea water it is found that there is a regular fall in the proportion which lay eggs (a third doing so in 25 per cent. sea water or distilled water, a tenth in 80 per cent. sea water); but there is also a fall in the percentage of eggs which hatch (under 10 per cent. at 50 per cent. sea

water, under 1 per cent. at 80 per cent). There are therefore two ways in which a higher salinity reduces the output of larvae.

The author also finds that if he rears mosquitoes from the egg in dilutions of sea water with dried yeast, he gets a 2 per cent. yield of adults, or less, at 75 per cent. sea water. If larvae are hatched in brackish water to which sea water is added, a small proportion can become adult even if the final concentration is equivalent to 80 per cent. sea water.

The salinity of a lagoon was increased by making openings to admit sea water and permit of tidal action. To eliminate breeding the salinity should reach 75 per cent. of that of sea water, except that after heavy rain it may be much lower for short periods. *P. A. Buxton.*

BISPHAM, W. N. **Malarial Immunity.** *Southern Med. J.* 1943, Sept., v. 36, No. 9, 636–9. [12 refs.]

BECKMAN, H. & SMITH, Jane. **A New Method of counting Plasmodia in Avian Malaria Infections.** *J. Lab. & Clin. Med.* 1943, Nov., v. 28, No. 14, 1735–40, 1 chart.

In a previous paper [this *Bulletin*, 1941, v. 38, 566] Beckman described a method of estimating the degree of malarial infection in birds based on the number of minutes occupied in counting twenty parasites. Subsequent experience has shown that this method was not sufficiently delicate to record slight differences. It has accordingly been modified as follows. The number of parasites counted under the one-twelfth inch objective in three minutes in successive fields of a part of the blood film where the red cells are not overlapping is taken as the index of infection. It was found by experience that though films and individual fields vary as regards density of red cells, the number of cells inspected for parasites in three minutes varies very slightly from slide to slide, so that the index obtained is of sufficient accuracy for the estimation of degrees of infection. *C. M. Wenyon.*

REDMOND, W. B. & PRATHER, R. M., Jr. **Variations in the Asexual Cycle of Plasmodium when transferred to an Abnormal Host.** *J. National Malaria Soc.* Tallahassee, Fla. 1943, v. 2, No. 1, 25–9, 2 figs. [10 refs.]

With a view to estimating the effect of the host on one species of bird malarial parasite the 1 P strain (the pigeon strain of *P. relictum*, originally isolated by COATNEY in 1938 from a young pigeon) was studied in pigeons and canaries. In both these birds satisfactory infections occur, which are pathogenic and sometimes fatal. As was described by Coatney, the parasite in the pigeon shows a high degree of synchronicity, the interval between two peaks of sporulation being 27 hours. In the canary there is a somewhat higher degree of synchronicity, the interval between the peaks being reduced to 24 hours. The only morphological difference noted is that in the pigeon the number of merozoites averaged 8·54 (extremes of 6 to 14), while in the canary the average was 9·15 (extremes of 6 to 16). The authors point out that this is the first instance in which the same parasite has been studied in two strictly comparable hosts, for neither the canary nor the pigeon shows any age resistance to the infection, while the immune reactions to superinfection are the same in both.

*C. M. Wenyon.*

MANWELL, R. D. **Malaria Infections by Four Species of *Plasmodium* in the Duck and Chicken, and resulting Parasite Modifications.**—*Amer. J. Hyg.* 1943, Sept., v. 38, No. 2, 211–22, 15 figs. on 2 pls. [14 refs.]

An investigation on four species of bird malarial parasite usually maintained in canaries has shown that the duck is a good host for all of them. These parasites are *P. circumflexum*, *P. elongatum*, *P. nucleophilum* and *P. relictum* var. *matutinum*. This would indicate that for chemotherapeutic studies in which ducks are employed it is no longer necessary to limit these to the single species *P. lophurae*, which is most commonly maintained in these birds. Observations mentioned in the paper indicate the probability that *P. cathemerium* and possibly other species may give rise to satisfactory infections in the duck. For all these species, with the exception of the one most pathogenic (*P. circumflexum*), the duck's resistance to infection increases with age. Exoerythrocytic stages have not been found in ducks, though WOLFSON has produced mosquito infections with *P. cathemerium*. Young chickens have been readily infected with *P. circumflexum* and *P. relictum* var. *matutinum*, but *P. nucleophilum* gave rise merely to a mild and transitory infection, and *P. elongatum* to no infection at all. The morphology of the parasites in the duck was similar to that in canaries, but in the chicks, on account of a greater resistance of the erythrocytes to distortion, conspicuous alterations occurred. During the course of the investigation it was noted that the strain of *P. nucleophilum* used had ceased to produce gametocytes.

*C. M. Wenyon.*

BARRETTO, M. P. Infecção do "Anopheles (N.) noroestensis" pelo "Plasmodium cathemerium." [**Infection of** *A. noroestensis* **with** *P. cathemerium.*] *Acta Med.* Rio de Janeiro. 1943, Apr.–May, v. 11, No. 4–5, 68–73, 2 figs. on 1 pl. English summary.

"This paper records observations on attempts to transmit *Plasmodium cathemerium* to *Anopheles* (*N.*) *noroestensis*. Forty-one specimens of this mosquito were fed on a bird (*Brachyspiza pileata*) naturally infected with *Plasmodium cathemerium* and maintained at 25°C. and 80–100 per cent. humidity. Dissected from 6 to 15 days after the infective meal, five mosquitoes (12·2 per cent.) were found to harbor oöcysts in their mid-gut. No sporozoites were observed in the salivary gland, although one mosquito showed a large oöcyst containing sporozoites."

RUSSELL, Paul F., ROZEBOOM, Lloyd E. & STONE, Alan. **Keys to the Anopheline Mosquitoes of the World.**

This book is reviewed on p. 325.

## TRYPANOSOMIASIS.

i. CHORLEY, J. K. **Tsetse Fly Operations. A Short Survey of the Operations by Districts.** *Bull. No. 1177. Dept. Agric. Southern Rhodesia.* 1941, July, 9 pp.

ii. ——. **Tsetse Fly Operations, 1941. Short Survey of the Operations by Districts for the Year ending December, 1941.** *Bull. No. 1208. Dept. Agric. Southern Rhodesia.* 1942, 6 pp.

[These two reports survey briefly the work done during 1940 and 1941 in the campaign against the tsetse fly in Southern Rhodesia. When these measures were begun (see JACK, this *Bulletin*, 1926, v. 23, 719; 1931, v. 28, 522) the aims were stated to be: to reduce game along the edge of fly-infested country; to create and maintain game-free zones ten miles or more wide beyond the farm boundaries; and to control motor traffic of hunters and prospectors. It was also considered necessary to increase facilities for entomological and biological research.

In the report for 1937 (this *Bulletin*, 1939, v. 36, 673) controlled game destruction and the creation of fly-free zones were said to be no longer in the experimental stage and they could be applied on the edge of the fly-belt wherever land was required for development; the opinion was expressed that the tsetse fly could be eradicated from all the infested areas in the colony by judicious extension of controlled game destruction over a period of years, game sanctuaries being established in areas clear of fly. In areas where elephant and rhinoceros were abundant, clearing of thicket and bush might be required.

In 1939 (this *Bulletin*, 1942, v. 39, 443) the position in the northern areas was regarded as very satisfactory; altogether at least 6,000 square miles had been cleared of tsetse and fly-infested districts were relatively remote from European settlements, native cattle had returned to cleared areas, and roads had been opened to ox transport. Near the Portuguese border in the south-east (Melsetter District), however, there had been a considerable loss of cattle from trypanosomiasis; *Glossina brevipalpis* and *G. pallidipes* were crossing from Portuguese territory and *G. morsitans* was approaching the border near the southern end of the district in the Sabi valley.]

i. During 1940 operations in the north were carried on over a front of 100 miles from Darwin to the west of the Angwa River, the cleared area remaining about the same in extent *viz.*, about 6,100 square miles. Cattle were introduced for the first time since 1912 near the junction of the Kana and Shangani rivers. In the Melsetter District the position had improved, only 132 suspected cases of trypanosomiasis in domestic animals having occurred, compared with 1,000 in the previous year; 20 were definitely diagnosed by blood smears. Fly-traps, of which 215 had been erected, caught a total of 22 tsetse (14 *G. brevipalpis* and 8 *G. pallidipes*) and 32 were caught by hand. Owing to the advance of *G. morsitans* in the lower Sabi valley, shooting of game was undertaken. The position in the various districts—Darwin, Doma Area, Urungwe, Lomagundi S.W., Gatooma, Sebungwe and Melsetter and the Sabi Valley—is briefly reported. A total of 15,509 wild animals were shot at a cost of 2·2 rounds of ammunition per head. Research included a study of the physiological condition of *G. morsitans* adults attracted by man and motor vehicles respectively [see JACK, this *Bulletin*, 1940, v. 37, 400].

ii. The year 1941 is described as one of "quiet but effective consolidation of the newly occupied advanced positions." An intensive effort was being made to render the whole of the Urungwe Native Reserve safe for cattle, and the number of native hunters employed was considerably increased. A large scheme of native settlement in this area during 1942 was planned. "Owing to the low density of the present native population and the absence of cattle over most of the area, little soil erosion has occurred in the past, the land is virgin and fertile compared with most native areas, and, with the development of water supplies, capable of holding a fairly dense native population. This is the first planned scheme of native settlement to be undertaken on land reclaimed from the tsetse in this Colony." The demand by the natives for more grazing is urgent.

In the Melsetter District animal trypanosomiasis had increased and was more widespread; of 252 suspected cases 105 were definitely diagnosed by blood smears. Only 12 tsetse (3 *G. brevipalpis* and 9 *G. pallidipes*) were caught in traps, while 35 (14 *G. brevipalpis* and 21 *G. pallidipes*) were caught by hand; 22 of the 35 were caught on the Rhodesian side of the border. In the Sabi valley, 11 deaths of domestic animals from trypanosomiasis at the Honde Dip were definitely diagnosed. A total of 20,512 wild animals were shot during the year at a cost of 2·1 rounds of ammunition per head. Notes are given of the position in the various districts and of traffic control.

*J. F. Corson.*

VAUCEL, M. Glossines du Cameroun Français. [**Tsetse Flies in French Cameroons.**] *Rev. Sci. Méd. Pharm. et Vét. de l'Afrique Française Libre.* 1943, Mar., v. 2, No. 2, 97–100, 19 figs.

PACKCHANIAN, A. **Infectivity of the Texas Strain of** *Trypanosoma cruzi* **to Man.** *Amer. J. Trop. Med.* 1943, May, v. 23, No. 3, 309–14, 1 fig. [18 refs.]

Though six species of *Triatoma* are known to be naturally infected with flagellates indistinguishable from *Trypanosoma cruzi* in the United States, especially in Texas, California, Nevada and Arizona, up to the present no human cases of Chagas's disease have been recorded from North America. Furthermore, it was not known whether the flagellates in the local bugs were infective to man.

The experiments described in this paper were carried out with the view of solving this question.

An adult negro was inoculated with material from an infected *Triatoma heidemanni* (endogenous in Texas) introduced into the left eye. He contracted an infection and showed symptoms of Chagas's disease a fortnight after exposure. The chief clinical findings consisted of acute oedema and hyperaemia of the eyelids and conjunctiva, enlargement of the axillary lymph nodes, and low-grade fever. Trypanosomes were demonstrated in the patient's blood from 21 to 63 days after infection; they also appeared in blood cultures, in experimentally infected rodents and monkey, and their presence was confirmed by xenodiagnosis. After a period of 84 days all tests designed to reveal the presence of trypanosomes were negative.

As the author concludes, "The present study demonstrates that the Texas strain of *T. cruzi* [originating from local Triatomids] is capable of infecting man with a disease clinically identical with Chagas' disease."

*C. A. Hoare.*

DAVIS, D. J. **Infection in Monkeys with Strains of *Trypanosoma cruzi* isolated in the United States.** *Pub. Health Rep.* Wash. 1943, July 2, v. 58, No. 27, 1006–10, 1 pl.

Although infections with flagellates indistinguishable from the developmental stages of *Trypanosoma cruzi* in its vector have been recorded repeatedly from Triatomid bugs in U.S.A., no human cases of Chagas's disease have yet been reported from North America. Since one of the commonest symptoms of the human disease in South and Central America is a unilateral oedema of the eyelids (Romaña's sign), which can be reproduced experimentally in monkeys, the author conducted a series of experiments to ascertain whether this phenomenon appeared in monkeys inoculated with United States strains obtained from local bugs.

The material was obtained from naturally infected *Triatoma gerstaeckeri* collected in Texas and *T. protracta* from California, as well as from laboratory-bred specimens of the former species experimentally infected on desert mice (*Peromyscus eremicus*) previously infected from a Texas bug strain of *T. cruzi*.

With these strains seven macaque monkeys were inoculated by dropping into one eye some faecal material from infected bugs, while three monkeys served as controls and were similarly infected with human strains of *T. cruzi* from Venezuela and Panama, obtained by feeding *Triatoma longipes* on infected desert mice.

Trypanosomes indistinguishable from *T. cruzi* appeared in the blood of all the monkeys, while Romaña's sign developed in three of the seven monkeys inoculated with U.S. strains. Biopsy was performed on a swollen lid of one of these. When examined histologically, sections revealed fibroblast proliferation and focal infiltration (chiefly perivascular) by lymphocytes, plasma cells and large mononuclears. Leishmanial forms of the parasite were found at the site of infiltration and motile crithidia were seen in saline used for the perfusion of the eyelid.

Complement fixation tests were done on the 10 experimental monkeys with an antigen made with a Panama strain of *T. cruzi*. The sera taken before the experimental inoculations were negative, but those taken after the animals became infected all fixed complement.

*C. A. Hoare.*

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## LEISHMANIASIS.

BOIX BARRIOS, J. Kala-azar infantil, antimonio y sistema reticulo-endotelial (trabajo basado en ciento sesenta casos de kala-azar infantil de observación personal). [**A Study of Infantile Kala Azar, Antimony and the Reticulo-endothelial System, based on 160 Cases under Personal Observation.**] *Med. Española.* 1943, Apr. & May, v. 9, Nos. 51 & 52, 412–26 ; 522–34, 5 figs. [Bibliography.]

Not infrequently the primary effect of an antimonial in the treatment of infantile kala azar is a negative phase in which all the symptoms are accentuated. This is particularly marked in the blood picture and in the degree of splenomegaly. Following this there is a general amelioration, the temperature gradually returns to normal, the skin regains its proper colour and the spleen becomes reduced in size. In some cases the spleen does not regain its normal size till some time after

the course of treatment is completed, while parasites are still demonstrable though return to health appears to be complete. In such cases it is inadvisable to discontinue treatment.

As regards the action of antimonials on the parasite, the author states that the older view of EHRLICH, that some special affinity exists between the drug and the parasite, has been abandoned. The therapeutically effective drugs are without action on the parasites *in vitro*. It has been noted that during treatment actual degeneration of parasites can be observed, but it is claimed that this has reference only to those that are extracellular. Nevertheless, it is a fact that the intracellular parasites gradually disappear. These changes must be due to alterations in the fluids of the body, and in the cytoplasm of the host cells for which antimony has some special affinity. As regards the cells, deposits of antimony can be observed within them in the form of granules, while radiographically there is increased opacity of liver and spleen. The anaemia which is such a prominent feature of kala azar is due directly to the changes brought about by the parasites in the reticulo-endothelial system. There is hyperplasia of the histioid elements of this system, and a proportionate hyperplasia of the haemocytoblastic elements, resulting in a kind of antagonism between the two. The leucocytes of the histioid series are increased, while those of the haemocytoblastic series are decreased. Other changes which occur in the blood are increase in the complement content, increased production of antibodies and diminished glutathione and cholesterol content.

The therapeutic effect of antimonials is due to the influence of these drugs on the cells of the reticulo-endothelial system, which regain their normal functions and are then able, with the assistance of the antimony within them, to destroy the parasites. In some cases where there is a concomitant malarial infection, antimony treatment eradicates both infections, while certain quinine-resistant cases of malaria respond to antimonials. A similar explanation may account for the good effects of gold in the treatment of tuberculosis, in which both the gold and the bacilli have special affinity for the reticulo-endothelial cells. Antimony resistance is to be accounted for, not by any peculiarity of the parasite, but by a failure of the reticulo-endothelial system to respond to the drug as it does in most cases. Similarly, the varying degrees of tolerance to the drug exhibited by different patients is to be attributed to variations in the same response.

*C. M. Wenyon.*

KORNETOV, N. I. & MIRZOYAN, N. A. [**Treatment of Visceral Leishmaniasis with Solusurmin.**] *Med. Parasit. & Parasitic Dis.* Moscow. 1942, v. 11, No. 6, 88–92. [In Russian.]

The authors report the results of tests with " solusurmin " (analogous to solustibosan) in the treatment of visceral leishmaniasis of infants in Central Asia.

Preliminary tests have shown that 2·5 cc. of a 2 per cent. solution per kgm., introduced intravenously into dogs, produced no toxic symptoms. " Solusurmin " dissolves readily in water, producing a clear solution which can be easily sterilized and will remain stable for a week even during the summer heat of Samarkand.

The full dose for human beings was 0·01 gm. per kgm., but at the beginning only $\frac{1}{3}$–$\frac{1}{2}$ of this was injected, the doses gradually increasing until the full dose was reached in the fourth or sixth injection.

The minimum course consisted of 16 injections, 30 being the average number, usually administered intravenously every other day, but sometimes daily.

Of the seven children treated with this drug four were completely cured, while in three the treatment was interrupted, with the result that two relapsed, but in one there was considerable improvement.

In general, "solusurmin" compared favourably with neostibosan, though the number of injections required to effect a cure with the Russian preparation was considerably greater. *C. A. Hoare.*

THOMPSON, R. B. **Kala-Azar in an English Seaman.** *Lancet.* 1944, Jan. 1, 17–18.

The patient was a seaman aged 22 who had served in Malta, where kala azar is said to be rife [this may be an exaggeration, only 12 patients were admitted to the Central Hospital during 1937 for leishmaniasis]. He was admitted to hospital in Newcastle, and the disease was typical, with double or triple temperature rise within 24 hours, enlargement of spleen and liver, anaemia with leucopenia, and parasites present in the sternal marrow. A course of tartar emetic failed to influence the condition, but when a course of sodium antimony gluconate (identical with solustibosan) was instituted, the temperature fell, and he was shortly discharged, apparently perfectly well.

*Charles Wilcocks.*

SEN GUPTA, P. C. **Observations on the Neuropathic Sequel of Diamidino-Stilbene Therapy in Kala-Azar.** *Indian Med. Gaz.* 1943, Nov., v. 78, No. 11, 537–43, 18 figs.

In earlier papers by NAPIER and SEN GUPTA [this *Bulletin*, 1942, v. 39, 748; 1943, v. 40, 121; 1944, v. 41, 18] on the treatment of cases of kala azar by diamidino-stilbene, it was noted that though a cure rate of about 98 per cent. was obtained, there were two drawbacks. The first was an immediate reaction of varying severity which, though sometimes very alarming, could be controlled by adrenaline; the second was a delayed reaction of a neuropathic type, of which seven cases were reported. Since then 10 further cases of this sequel have come to light, making a total of 17 cases amongst 104 treated with the drug. The neuropathic symptoms, confined almost entirely to the face, first made their appearance three to four months after completion of the course of treatment. There was no evidence that patients developing these symptoms had received more of the drug than the others, nor that they were related in any way to the severity of the immediate reaction. Analysis of the symptoms showed that the salient features were: (1) subjective sensory disturbances, paraesthesia and anaesthesia over parts of the area supplied by the trigeminal nerve, (2) dissociated anaesthesia, loss of sensation of light touch with preservation of sense of pressure, pain and temperature over variable parts of the trigeminal area, (3) absence of nerve lesions elsewhere. It is concluded that the lesion in these cases is in the principal sensory nucleus of the fifth nerve in the pons. It is probably a toxic degeneration, and the syndrome may well be given the name suggested by NAPIER and SEN GUPTA in their original paper, *viz.* diamidino-stilbene neuropathy. As trichlorethylene inhalations may give rise to bilateral loss of sensation in the trigeminal area, and have been employed to alleviate

symptoms of trigeminal neuralgia, it is suggested that it is the ethylene component of the drug under discussion which is the cause of the trouble. In a few cases there was extension of the symptoms to the neck, while in a few there was loss of sensation to pain, showing that the lesion might involve areas beyond the nucleus of the fifth nerve. The only treatment of cases with troublesome paraesthetic symptoms which gave results was injections of 1/100,000 solution of cobra venom in increasing doses. This produced some degree of subjective improvement. The condition is not dangerous to life, and has a tendency to slow recovery. *C. M. Wenyon.*

CHOPRA, B. L. **Oriental Sore and its Epidemics and Treatment.** *Med. Bull.* Bombay. 1943, Sept. 4, v. 11, No. 17, 319–20.

During July and August 1942, the author observed 10 cases of oriental sore in Kasubegu, a station five miles from Ferozepore. A cure was effected by the local injection of 2 cc. of orisol (berberine sulphate solution) on one or more occasions. *C. M. Wenyon.*

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## FEVERS OF THE TYPHUS GROUP.

PFEFFER, G. & GAUWERKY, F. Günstige Wirkung von Rekonvaleszentenblut auf den Verlauf des Fleckfiebers. [**Benefit from Convalescent Blood in Typhus Fever.**] *Klin. Woch.* 1943, July 24, v. 22, No. 30/31, 481–4, 1 chart.

A detailed analysis is given of 50 cases in which convalescent blood was given during the first week in doses of 200 cc. The blood was collected 8 to 21 days after defervescence, and was given intravenously. The results are contrasted with those of 100 control cases comparable in all other respects but 1·2 years older on the average.

The height of the temperature was not affected, but the average duration of the fever was 2·1 days shorter in the treated patients, and the fatality rate was 8 per cent. against 12 per cent. in the controls.

The symptoms associated with the nervous system were less severe in the treated patients, and there were no septic complications, whereas there were 8 cases of parotitis among the controls. No significant difference was observed in the complications referable to the respiratory system, the pulse rate, blood pressure, or rash.

Of 9 patients who were transfused after the end of the first week 5 died, and of 6 transfused with healthy blood 2 died.

*John W. D. Megaw.*

ALWENS, W. & FRANK, H. R. Beitrag zur Serumtherapie des Fleckfiebers. [**A Note on the Serum Therapy of Typhus Fever.**] *Klin. Woch.* 1943, Oct. 16, v. 22, No. 42/43, 639–41, 3 figs. [16 refs.]

The evidence supplied by the authors to support their conclusions consists chiefly of three temperature charts with a few notes on each. In the first case the temperature was 38·4°C. on the morning of the third day, and normal in the evening; on the fourth day it rose to 40°C. On this day a dose of 40 cc. of convalescent serum was given

intravenously, and the same dose was repeated on the fifth day. The temperature fell rapidly and became normal by the end of the sixth day. Nothing is said of the grounds on which the diagnosis of typhus fever was based. The other two cases resembled each other very closely, the temperature had exceeded 40°C. [104°F.] by the evening of the second day. Each of the patients was given one dose of serum on the second day and one on the third. The doses ranged from 90 to 120 cc. By the end of the third day the temperature had fallen; it remained almost normal, till the seventh day in one case and till the ninth day in the other, then it rose again for two days with a return of the neurological symptoms. Each patient was given two further doses of serum, and again the temperature fell to normal. From the 12th day in one case, and the 14th day in the other, there was low-grade fever for two or three days, but no serum was given.

In these two cases the diagnosis was based on a "rising Weil-Felix titre," the prompt response to serum treatment, the neurological symptoms, the total duration of illness, etc. No mention is made of a rash or of the titre of the reaction, but the course taken by the fever was regarded as being explained by the antitoxic action of the serum, which twice controlled the fever but had no virucidal action.

In the summing up the authors state that their conclusions were reached after personal experience of the serum treatment in 22 of 48 cases, but they give no details of these.

They claim that intravenous doses of 100 cc. convalescent serum given on the first or second day and repeated on the following day give immediate control of the fever and symptoms for five days or longer, and that the recurring fever can be controlled by two further doses—up to a total of 500 cc. in all. After the third day the action of the serum is uncertain, and after the fifth day no benefit can be expected.

[These results are much better than any that have been reported by other observers, so it is tantalizing to be given such scrappy information about the clinical and other features on which the diagnosis was based. The reader must "take the evidence or leave it."] *John W. D. Megaw.*

RAETTIG, H. Kombinierte Fleckfieberbehandlung mit Rekonvaleszentenserum und Eigenblut. [**Treatment of Typhus Fever by Convalescent Serum in Combination with Autohaemotherapy.**] *Klin. Woch.* 1943, Sept. 4, v. 22, No. 36/37, 560–63.

The author claims good results in typhus fever from daily doses of 20 to 40 cc. of convalescent serum, combined with daily doses of the patient's own blood given by the intramuscular route. In all suspected cases 40 cc. of the patient's blood are given at once, and the dosage repeated daily for three or four days; in cases of moderate severity no further special treatment is needed, but in all severe attacks the treatment is continued throughout the febrile period, and convalescent serum is also given in daily doses of 20–40 cc. from the moment that the diagnosis is made.

[The personal impressions of the author constitute the chief evidence of the value of the treatment; the statistical results are not very convincing, unless one is prepared to accept the author's argument that they

would have been much more favourable but for the high prevalence of complications and the adverse influence of climatic conditions.]

The patients taken into consideration include 300 admitted before the 10th day of the fever ; 100 other patients were treated, but 91 were admitted after the 10th day, and 9 had been inoculated against typhus.

The results are analysed in two groups ; the first consisted of 143 patients treated in the experimental stage of the investigation, before the treatment was standardized ; the second consisted of 157 patients treated as described above.

| | Cases. | Percentage Fatality-rate |
|---|---|---|
| I—*Preliminary Group.* | | |
| No special treatment ... ... ... ... | 81 | 12·4 |
| Convalescent serum in single doses of various sizes ... ... ... ... ... ... | 38 | 13·2 |
| Convalescent serum ; 20 to 40 cc. daily, throughout ... ... ... ... ... | 19 | 5·3 |
| Patient's own blood, 3 doses ... ... ... | 5 | 0·0 |
| Total ... | 143 | 11·2 |
| II. *Test Group.* | | |
| No special treatment (relatively mild cases) | 20 | 0·0 |
| Patient's own blood, 3 doses (relatively mild cases) | 45 | 0·0 |
| Combined standard treatment (more severe cases) ... ... ... ... ... ... | 92 | 16·3 |
| Total ... | 157 | 9·6 |

*John W. D. Megaw.*

SPARROW, H. & MARESCHAL, P. Innocuité pour l'homme de la piqûre du pou typhique et données expérimentales sur les conditions de l'infection typhique. [**Harmlessness of the Bite of Lice Infected with Typhus.**] *C. R. Acad. Sci.* 1942, v. 215, No. 17, 389–91. [Summary taken from *Rev. Applied Entom.* Ser. B., 1943, Dec., v. 31, Pt. 12, 234–5.]

These experiments were carried out in view of doubts as to the ability of *Pediculus humanus*, L., to transmit typhus by its bite. In the first series, batches of 60–100 lice that had been infected 6–8 days previously by anal injection with murine or epidemic (louse-borne) typhus were fed on 11 mental patients. In some cases the lice, the feeding cages, and the skin where the cages had been placed were disinfected with alcohol, but in others this was omitted and the patients were encouraged to scratch the skin soiled with excreta after the cage was removed. No infection resulted, though the excreta were shown to be rich in virulent rickettsiae. Most of the patients were subsequently shown to be susceptible to the strains to which they had been exposed, as infection was obtained by placing on the forearm a drop of normal saline containing excreta or intestine from infected lice and scarifying the skin or by placing intestine or the dried or powdered excreta of infected lice on the conjunctiva.

KÜMMERLING, K. Wolhynisches Fieber (Fünftagefieber, Febris quintana). [**Trench Fever.**] *Med. Klin.* 1943, June 25, v. 39, No. 25/26, 451–4. [22 refs.]

From this detailed description of trench fever it appears that no diagnostic test is yet available to the physician, and that no drug has been shown to have any curative effect on the disease.

Isolation of the Rickettsia by feeding clean laboratory-bred lice on the patient, and even the Rickettsia-agglutination reaction, are practicable only in special laboratories. Also, negative results with the agglutination test do not exclude the disease.

The chief clinical features are—(1) the fever curve, when this shows short febrile paroxysms or waves of fever recurring periodically; (2) severe neuralgic-rheumatic pains, especially the shin-bone pains, which occur in 70 per cent. of the cases; (3) enlargement of the spleen without signs of disease in other organs. Helpful points in diagnosis are: the presence of louse infestation, the known occurrence of the disease in the locality, the rise in the leucocyte count during the febrile periods and the fall in the intervals, and the exclusion of other diseases by cultural and other methods.

An important point is the risk attending the use of habit-forming drugs in a prolonged disease of this kind. *John W. D. Megaw.*

ECKARDT, P. Zum Funftagefieber. [**Trench Fever.**] *Klin. Woch.* 1943, July 24, v. 22, No. 30/31, 495.

The author believes that the neurological manifestations of trench fever are due to localized myelitis affecting the posterior horns of the spinal cord. The pains in different parts of the body are associated with lesions of any of the segments between the third cervical and the first sacral. Zones of analgesia of the skin areas supplied by the corresponding nerves can often be detected; they should be looked for in all cases of fever with a four to six day periodicity in which the classical shin-bone pains do not occur, but are replaced by any of the following symptoms: (1) tachycardia and precordial pain; (2) abdominal pains at night; (3) recurring urinary colic and tenesmus of the bladder; and (4) recurring spells of diarrhoea. *John W. D. Megaw.*

PARKER, R. R. & KOHLS, G. M. **American Q Fever: the Occurrence of *Rickettsia diaporica* in *Amblyomma americanum* in Eastern Texas.** *Pub. Health Rep.* Wash. 1943, Oct. 8, v. 58, No. 41, 1510–11.

*R. diaporica* was demonstrated in 1937 in 10 of 92 batches of nymphal and adult *A. americanus* from animals, or from vegetation, in Eastern Texas. The strains were passed through guineapigs, which showed illness characteristic of that induced by the original strains isolated from *Dermacentor andersoni* in Montana. Some of the animals which recovered were tested and found to be immune to American Q fever, but not to Rocky Mountain fever. Blood serum passed through a Berkefeld filter was infective; one strain established in eggs exhibited the characteristics of *R. diaporica.* *Charles Wilcocks.*

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## YELLOW FEVER.

LEWIS, D. J. **The Culicine Mosquitos of Eritrea.** *Bull. Entom. Res.* 1943, Dec., v. 34, Pt. 4, 279–85, 1 fig. (map).

The author made a two months' tour during the dry season, and records the Culicines collected at a large number of places, from the coast to an altitude of 2,480 metres. As his work is connected with problems of yellow fever, he made a close search of domestic breeding places, and found *Aëdes aegypti* widely distributed up to about 1,650 metres: higher than that the species was consistently absent, though domestic water containers were abundant. Many other domestic mosquitoes were found; also several species which are known to be capable of carrying yellow fever.

The total number of Culicines known from Eritrea is 28.

*P. A. Buxton.*

SWARTZ, H. **Systemic Allergic Reaction induced by Yellow Fever Vaccine.** *J. Lab. & Clin. Med.* 1943, Nov., v. 28, No. 14, 1663–7.

The record of a case of severe constitutional reaction to a single immunization injection of yellow fever vaccine.

The patient, a 27-year-old white man, became acutely ill less than 5 minutes after receiving a single injection of cholera vaccine and one of yellow fever vaccine. He developed angioneurotic oedema, urticaria, gastrointestinal symptoms, and severe dyspnoea, and in a short time lost consciousness. He regained consciousness after repeated subcutaneous injections of epinephrine; he was admitted to hospital and was discharged, apparently recovered, after six days but relapsed two days later and the symptoms continued with varying severity for some weeks.

The allergic reactions of this patient were studied and he was found to possess marked egg and fowl sensitivity. In view of the fact that the yellow fever vaccine was prepared from inoculated eggs containing developing embryos, this was obviously the cause of the reaction to the injection.

The author is of the opinion that medical officers using vaccines should know something of the constitution of the immunizing injection and the subject to whom it is given, so that in cases of marked sensitivity to egg, fowl meat or both, the vaccine can be given carefully in divided doses, with epinephrine at hand in the event of any severe reaction.

*E. Hindle.*

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## DENGUE AND SANDFLY FEVER.

DANIELS, W. B. & GRENNAN, H. A. **Pretibial Fever. An Obscure Disease.** *J. Amer. Med. Ass.* 1943, June 5, v. 122, No. 6, 361–6, 5 figs.

An outbreak of a decidedly "unusual febrile illness" occurred between July 29 and September 11, 1942, among soldiers quartered in a well-defined populated area close to a stream near Fort Bragg, North Carolina. The chief features of the 40 cases were as follows:—The onset was sudden, with fleeting coryza, sore throat, and cough,

in 30 per cent. of the patients. The fever lasted two to eight days; there were spiky rises, often two or three daily, accompanied by chills. The spleen was palpable in 95 per cent. of the cases. A rash was seen about the fourth day in all but five of the patients. In 60 per cent., this was restricted to the pretibial areas: in 25 per cent., there were also scattered spots on other parts of the body. The spots were slightly raised, erythematous, and often were 2 to 5 cm. in diameter. Brown staining persisted for about two weeks. Convalescence was rapid.

Leucopenia was pronounced in all but five of the cases about the third or fourth day. The lowest count was 2,600 per cmm.; the highest, 14,800. In 16, the count fell below 4,500 at some stage of the fever.

Blood and other materials, taken from five patients between the second and fourth days, were thoroughly investigated by a special commission of experts. Films, serum reactions, cultures (on ordinary media and yolk sacs) and animal inoculations in guineapigs, rats, monkeys, and human beings, all gave negative results.

A systematic search for possible vectors yielded no conclusive results; sandflies and midges could not be found; ticks were present but were regarded as unlikely to be vectors; Culex and Aëdes mosquitoes were found, but not *Aëdes aegypti*.

Similar cases were described by BOWDOIN in Georgia in 1940 (*J. Med. Ass. Georgia*, 1942, v. 31, 437).

[Although the fever does not conform clinically to the dengue pattern, and transmission by *Aëdes aegypti* has been excluded, the failure to isolate a causal organism suggests a filter-passing virus as the cause; and the conditions of occurrence suggest an analogy with Colorado tick fever [see this *Bulletin*, 1941, v. 38, 694] and Bullis fever [*ibid.*, 1944, v. 41, 34]. The special conditions resulting from the war have brought to light a number of interesting "speculative" short fevers, some of which are probably caused by a filter-passing virus, and are possibly members of the dengue group.] *John W. D. Megaw.*

COHEN, N. A. **Pretibial Fever.** [Correspondence.] *J. Amer. Med. Ass.* 1943, Dec. 4, v. 123, No. 14, 927.

The writer of this letter has had experience of several hundreds of cases of dengue in an area where dengue is hyperendemic. "The clinical manifestations of the disease were no different from those described in the article mentioned [by DANIELS & GRENNAN, above] with the exception of the predominance of the pretibial lesions. Such pretibial lesions, however, were not uncommon in this series, although they were generally associated with similar lesions on the trunk."

The writer quotes from articles by several authors in support of his view that pretibial fever cannot be differentiated from dengue fever or (as some think) the group of fevers included in the term dengue.

*J. F. Corson.*

HALLIDAY, J. H. & HORAN, J. P. **An Epidemic of Polyarthritis in the Northern Territory.** *Med. J. Australia.* 1943, Oct. 9, v. 2, No. 15, 293–5.

A series of 105 cases of a hitherto undescribed disease has been studied in two hospitals in the Northern Territory of Australia. The

patients were soldiers who were attacked near Darwin and at places about 150 miles south of this, in the months of November and December 1942, and January, 1943. Other cases had occurred previously.

The name acute polyarthritis is suggested for the disease. The onset was gradual, with fever and painful swelling of the joints, except in the mildest cases. The fever lasted two to five days ; the temperature seldom exceeding 101°F., and subsiding irregularly. The joints affected were chiefly those of the hands and feet ; the swelling subsided after a week or so, but pain on movement lasted three to four weeks. In some cases there was effusion for one to seven days ; there were no after effects.

A discrete maculopapular rash was seen in most of the cases, on the trunk and extremities, but not on the face : It sometimes tended to be vesicular and to simulate varicella. It appeared on the second or third day. Groups of petechiae were sometimes seen on the soles of the feet.

The axillary, inguinal, and femoral, glands were enlarged and tender in every case ; occasionally other glands were enlarged. The tenderness disappeared in three to four days, and the swelling gradually subsided.

The leucocytes averaged 10,000 per cmm. ; the range being 5,500 to 15,000. Occasionally there was a moderate degree of neutrophilia.

Agglutination tests with *Proteus OX19*, *Pr. OX2*, and *Brucella abortus* were negative ; bacteriological investigations of fluid from the joints and of blood gave negative results ; the tests included inoculations into rabbits, guineapigs, mice, and developing hens' eggs.

Dengue was excluded by the pronounced differences in the clinical features ; by the geographical distribution, which extended farther south ; and by the absence of *Aëdes aegypti* from two camps in which a considerable number of cases occurred. The aetiology is unknown.

[This appears to be yet another of the short fevers that are cropping up in military camps in various parts of the world. Most of them seem to be more nearly related to dengue than to any of the other classical diseases. Information with regard to the epidemiology of this series of cases is scanty. The name acute polyarthritis is likely to suggest a more serious form of disease, especially as there was no swelling of the joints in mild attacks in the present series.] *John W. D. Megaw.*

[KELLY, M. (*Med. J. Australia*, 1943, Nov. 27, 451) suggests that the outbreak described above to some extent resembles Haverhill fever (*erythema arthriticum epidemicum*) though the onset was more gradual and the symptoms milder than in the latter disease. See *Bulletin of Hygiene*, 1935, v. 10, 251.—*Ed.*]

GONTAEVA, A. A. [**Sand Fly Fever and the Permeability Problem.**] *Med. Parasit. & Parasitic Dis.* Moscow. 1943, v. 12, No. 1, 64–9. [11 refs.] [In Russian.]

In the course of clinical observations on 154 cases of sandfly fever (which included 14 experimentally infected volunteers) the author's attention was drawn to the constancy of the exudative neurovascular syndrome. This led her to study the pathogenesis of the disease from the point of view of the permeability of the blood-tissue barriers. The capillary filtration and the permeability of the vessels for protein were tested by Landis's method, the index of permeability with blistering

was estimated according to Petersen, and the endothelial symptom was observed according to Rumpel-Leede. Tests and estimates were also made of the blood-volume by the haematocrit method, of the amount of protein in the blood serum and its fractions, as well as of the haemodynamic state (venous and arterial pressure, circulation time, etc.).

Though the results obtained were not conclusive, all the tests pointed definitely to an increase in the permeability of the blood-tissue barriers. This is also reflected in the clinical picture: hyperaemia of the face, neck and chest, vascular changes in the throat and in the eyes, and an intestinal syndrome simulating appendicitis. The nervous symptoms in sandfly fever also appear to be due to increased permeability of the cerebral vessels (the blood-brain barrier), while the higher pressure of the cerebrospinal fluid can also be attributed to the same cause.

In general, it would appear that the increased permeability of the blood-tissue barriers represents one of the most characteristic changes in sandfly fever, responsible for most of the clinical manifestations. Conversely, the period of convalescence can be regarded as the phase of gradual elimination of the surplus intracranial fluid. *C. A. Hoare.*

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## PLAGUE.

Blanc, G. & Baltazard, M. Recherches expérimentales sur la peste. L'infection de la puce de l'homme, *Pulex irritans*, L. [**Plague Infection of** *P. irritans.*] *C. R. Acad. Sci.* 1941, v. 213, No. 22, 813–16. [Summary taken from *Rev. Applied Entom.* Ser. B. 1943, Dec., v. 31, Pt. 12, 234.]

The usual methods of flea collection adopted in studies of the epidemiology of plague are such that rat fleas are collected and *Pulex irritans*, L., is not, as it is generally assumed that the disease is transmitted from rats to man and not from one man to another. In view, however, of the frequent occurrence of successive cases in individual families during an outbreak of plague in Morocco, investigations were made on the possible importance of *P. irritans* as a vector. The fleas were collected in the following manner. As soon as possible after a death from plague, the corpse was stripped and removed. All the clothes and coverings used by the deceased were left in the room, and the door and all openings by which light could enter were sealed up. After 4–5 days, the door was opened and a large shallow white dish, half filled with water, was quickly placed in the shaft of light from it. The hungry fleas were at once attracted to the white surface and fell into the water, whence they were collected in glass tubes. Batches ranging from 1 to 200 fleas were obtained, and 29 strains of plague were isolated by injecting suspensions of them into guineapigs or rats. In all the cases that gave positive results the animals died of plague 3–7 days later. Infection was similarly demonstrated in a batch of about 200 fresh fleas that had been allowed to feed on a patient dying of plague. It was shown to persist for 21 days in living fleas from houses of persons who had died of plague and for five days in dead fleas or

in the excreta of fleas under natural conditions. A mouse was successfully infected by placing a few drops of diluted excreta on the mucous membrane in the mouth. Finally, three guineapigs in succession were successfully infected by the feeding of a mixed batch of several hundred fleas from the houses of dead persons.

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## BACILLARY DYSENTERY.

BONNIN, N. J. & KAY, H. B. **Dysenteric Arthritis : Case Reports and Comments.** *Med. J. Australia.* 1943, Nov. 6, v. 2, No. 19, 380–82.

The chief interest of this paper is not so much the record of five cases of dysenteric arthritis as the recognition of this condition in what otherwise would have been considered and treated as traumatic synovitis. The association appeared doubtful from the history, but in four instances *Bacterium dysenteriae*, Flexner, was recovered on culture by means of sigmoidoscopic swab and it was isolated from the faeces in the fifth. In each case a history was obtained of an attack of acute diarrhoea some time (8 months, 6 weeks, 4 months, 3½ months and 2 weeks), previous to the onset of synovitis. In three of the patients the joint affection followed trauma ; in two no history of trauma was obtained, but sigmoidoscopy revealed a granular proctitis from which the dysentery bacillus was isolated.

In four of the cases the knee was affected, in the fifth the ankle and second toe.

The results of treatment with sulphaguanidine were very favourable with large doses (120–126 gm.) being given in a single course. It is probable that in one instance at least a diagnosis of traumatic synovitis had delayed correct treatment for months.

The features common to these cases were fairly sudden onset of mild aching pain, increasing at night, with moderate synovial effusion and raised joint temperature. Emphasis is laid upon the absence of local tenderness, pain on movement and periarticular swelling. The effusion and aching persisted in spite of rest.

In the Northern Territory of Australia and other areas where dysentery is prevalent, any patient with arthritis of the type described should be investigated from this point of view. *P. Manson-Bahr.*

GARD, J. J. **The Sulphaguanidine Treatment of Shiga Dysentery in New Guinea.** *Med. J. Australia.* 1943, Sept. 4, v. 2, No. 10, 188–90.

The author makes an interesting point in this paper. Although many patients suffering from dysentery were admitted to hospital during the campaign in New Guinea, it was not until the closing stages that Shiga infections were seen. Since this type of dysentery is common in Japan, it is possible that the enemy was the source of infection, especially as the majority of these patients, admitted to the Australian General Hospital, had been in close contact with and had occupied ground fouled by the Japanese. [If this is the correct explanation it is reasonable to expect a high rate of Shiga infections in all campaigns against the Japanese, especially when the enemy is in retreat.]

Treatment consisted of an initial dose of 2–4 drachms of sodium sulphate followed two hours later by 7 gm. of sulphaguanidine. Thereafter 3·5 gm. of sulphaguanidine were given every four hours from 6 a.m. to 10 p.m. This treatment was continued until the number of stools *per diem* was 5 or less, when the dosage was reduced to 3·5 gm. three times a day. When the number of stools had been normal for 2–3 days the drug was discontinued.

The results, in the 25 patients so treated, were good. The average dose of sulphaguanidine required for cure was 152 gm.; no toxic effects were seen; stools became normal in an average of 11·5 days; there were no deaths. Antitoxic serum was not used, nor was it needed. The author advocates that treatment with sulphaguanidine be instituted as early as possible, before large areas of mucosa have been destroyed. *Charles Wilcocks.*

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## AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS.

AYRES, W. W. **Observations on the Growth of *Entamoeba histolytica* in Media containing Sulfathiazole. Preliminary Report.** *U.S. Nav. Med. Bull.* 1943, May, v. 41, No. 3, 714–16.

The author has studied the effect of sulphathiazole on cultures of *Entamoeba histolytica* in Craig's Locke-serum starch medium. The drug, when added to the medium to give a strength of 60 mgm. per cent., did not appear to be toxic to the amoebae. In some cases the growth of the amoebae was improved by the addition of the drug, presumably through the control of certain injurious bacteria. One strain was stimulated by the addition of *Bact. coli*. During the experiments it was observed that amoebae replete with red blood corpuscles discharged these from the posterior end when in motion. The author states that his preliminary results indicate that further experiments along these lines are worth conducting. *C. M. Wenyon.*

JACKMAN, R. J. & COOPER, W. L. **Value of Proctoscopy in the Diagnosis of Amebiasis.** *Amer. J. Digestive Dis.* 1943, Oct., v. 10, No. 10, 365–6.

The value of proctoscopy in the diagnosis of amoebic dysentery is considered by many as controversial. In a study of 115 patients, all of whom had sufficient intestinal symptoms to warrant microscopic examination of the stools, ulceration of the lower part of the bowel was found in 20·8 per cent., typical, or suggestive, of amoebic ulceration. For this relatively low percentage of active and visible ulceration it is explained that the type of amoebiasis observed at the Mayo Clinic differs somewhat from that in other sections of the United States in that the condition has usually been of longstanding and subjected to previous treatment.

With regard to the location of the ulcers, there did not seem to be any predilection for the edges of the valves. In 1·7 per cent. repeated faeces examination gave negative results, but scrapings from rectal ulceration in one, and biopsy of an ulcer in a second, afforded the means of demonstrating *Entamoeba histolytica*. A definite statement is permissible that, given a patient suspected of amoebiasis, and whose

faeces after repeated examinations have given negative results, direct proctoscopic examination should be undertaken with the idea of obtaining positive evidence.

To the senior author, who had previously pointed out the relative frequency with which anal abscesses occurred in chronic ulcerative colitis and regional ileitis, it was surprising that only one out of this series had an ischio-anal abscess and one an anal fistula. This figure, 1·7 per cent., contrasts with 30 per cent. in regional ileitis and 8·4 per cent. in chronic ulcerative colitis.

One case of amoebic granuloma, which is so liable to be confused with malignant disease, was seen. The differential diagnosis was established by biopsy and demonstration of amoebae in the faeces. This latter finding cannot by itself be taken as sufficient to exclude malignant growth, for one of the patients with amoebiasis was found subsequently to have a coexisting carcinoma in the lower sigmoid demonstrable solely by proctoscopy.

Two patients were found to have single sessile polypi in the sigmoid which possibly might be regarded as pseudopolypi analogous to those of chronic ulcerative colitis. Rectal stricture was found once in a longstanding amoebic infection; it did not resolve after intensive treatment. *P. Manson-Bahr.*

IVANISSEVICH, O., TAIANA, J. A., NIÑO, F. & ROSITO, E. Amibíasis hepatopleuropulmonar. [**Hepato-pulmonary Amoebiasis.**] *Bol. Inst. Clín. Quirúrg.* Buenos Aires. 1943, July–Aug., v. 19, No. 159, 399–404, 5 figs. English summary.

A fairly straightforward case in an Argentinian, 20 years of age. He had suffered for two months with pain in the right shoulder and right side of the chest and had lost 10 kilos. in weight. He was pallid and cyanosed, with subicteric tint, and was expectorating chocolate-coloured matter in which trophozoites of *E. histolytica* were found. On the day after his admission 400 cc. of reddish turbid fluid were removed by thoracentesis through the eighth right intercostal space and three days later another 150 cc., and 50 cc. more after another week. The temperature having been normal after the second aspiration the patient left hospital, but returned in a fortnight as his general state was deteriorating. He was expectorating 250 cc. of thick yellowish sputum daily. The blood showed little abnormal: red cells 4,640,000, white cells 8,900 per cmm., Hb. 85 per cent., C.I. 0·9, neutrophiles 49, eosinophiles 16, monocytes 17, lymphocytes 18 per cent. Hydatid was ruled out; at least no positive evidence of it, except possibly the eosinophilia, was found, nor was *E. histolytica* seen this time in the sputum. A course of emetine was started and two days later the entamoeba was found in the sputum. He had two courses of emetine, with an interval of 30 days between them, during which he had 0·5 gm. of amoebarsone daily for five days. Symptomatic treatment comprised cardiac tonics, blood transfusion [no reason is given for these], calcium, hypertonic glucose intravenously, ascorbic acid, thiamin and iron. Apparently all went well, but nothing is said about further progress. [In the detailed history the authors make no mention of any preceding attack of dysentery, though they deem it important enough to note that the patient's father had had a hemiplegia, that he himself smokes a packet of cigarettes daily, and his habits include "moderate ethylism," a very nice euphemism.] *H. Harold Scott.*

KARLEN, M. A. Un nuevo caso de tumor inflamatorio amibiano de Lasnier. [**A New Case of Lasnier Amoebic Granuloma.**] *Arch. Uruguayos de Med., Cirug. y Especialidades.* 1943, July, v. 23, No. 1, 63–72, 4 figs.

The case reported is that of a woman 54 years of age who, with a previous history of hysterectomy for fibroids, developed a painful tumour in the right iliac region. A laparotomy was performed, and it was found that the tumour was produced by a thickening of the caecum and lower part of the ascending colon. As it did not seem possible to interfere, the wound was closed and healing occurred normally. The nature of the tumour having given rise to a suspicion of amoebic infection, careful faecal examinations were instituted. Eventually, after saline purges, undoubted amoebae with included red blood corpuscles were discovered. Emetine and carbarsone were administered but these drugs did not prevent the development of an abscess in the region of the caecum. This was opened and drained, amoebae with included red blood corpuscles being found in the pus. Complete healing occurred in 23 days, this being accompanied by a return of normal health and general improvement in the condition of the blood, which at the commencement had revealed a marked anaemia and leucocytosis. The patient had no return of symptoms, and a radiological examination conducted five months after the operation showed that the caecum and colon were functioning normally.

*C. M. Wenyon.*

HEILIG, R. & VISVESWAR, S. K. **On the Cardiac Effects of Emetine.** *Indian Med. Gaz.* 1943, Sept., v. 78, No. 9, 419–24, 8 figs. on 1 pl. [18 refs.]

This is an important paper. There is no agreement upon the frequency and extent of untoward cardiac by-effects of emetine, or upon the best method of administering this drug. This is unquestionably of practical importance, because, if general opinion that emetine should not be given if heart lesions exist were justified, it would be difficult to find a case where it could safely be used ; most of the author's cases of amoebic dysentery showed some signs of myocardial damage, due to coexistent ankylostomiasis. Difference of opinion manifestly exists on the best way of administering emetine. Most authorities have ruled that the intravenous route is dangerous, though MÜHLENS always preferred this method to any other.

Material has been collected with reference to two main questions : (1) whether emetine, intramuscularly in therapeutic doses, causes cardiac damage so frequently that special care is necessary, or whether it is absolutely contraindicated, if some cardiac lesion is present ; (2) whether there is any significant difference between the by-effects of intramuscular and intravenous administration in man.

Forty-five unselected patients (10 of them women) with acute amoebic dysentery, received twelve emetine injections—one grain *per diem*—the course consisting of two series of six injections with one day's interval. To 14 emetine was given intramuscularly and electrocardiograms were taken before the first, after the sixth, and after the twelfth injection ; at the same time orthodiagrams were traced and blood pressure estimated. Thirty-one patients (6 females) received the same amounts of emetine, with the same spacing, intravenously. In 16 of these, electrocardiograms were taken and blood pressure estimated before and at various intervals (up to one hour) after the

first and second, sixth or twelfth emetine injections: in the remaining 15 the same procedure was adopted, with orthodiagrams in addition, before the first and after the sixth and twelfth grain of emetine. In most of the cases electrocardiograms were traced at all three stages of the emetine course, before and after exertion (which consisted in climbing thrice up and down 29 steps at maximum speed).

Out of 14 patients treated with intramuscular emetine, no less than 11 had a pathological electrocardiogram before treatment was initiated; these pathological findings consisted in low voltage, flat T-waves, or, rarely, in a depressed S–T. During treatment of three *normal* cases, one was uninfluenced, one developed a slightly higher $P_2$, $T_1$ and $T_2$, as the course progressed, and "one became worse as far as the cardiogram was concerned."

The following cardiographic changes accompanied intramuscular emetine. Some improvement was obtained in 11 out of 14; no change in 2; some deterioration in 1 initially normal case.

After intravenous emetine injections the cardiographic changes showed a wider range of variation. In none of the 31, of whom only 8 had a normal cardiogram, did any irregularity of the heart rhythm appear: no extra systoles, no block, no auricular fibrillation.

Sixteen patients were tested in short-range experiments, *i.e.* cardiograms taken before the first intravenous injection of one grain of emetine, and 5, 15, 30 and 60 minutes afterwards, or before and 15 minutes after the first, second, sixth or twelfth intravenous emetine injection. Amongst these four had a normal electrocardiogram when treatment commenced, but within one hour all four showed some deterioration under influence of emetine. Out of five women, all of whom presented some pathological electrocardiographic signs on admission, four remained unaltered after emetine. The total result in these 16 cases was that, in the course of intravenous medication, no definite changes were noted in 10 while in the other six the following alterations occurred: a prolongation of P–Q (delayed conduction) was seen twice; the voltage of R in one or more leads was diminished in three; and the T-waves in one or more leads were flattened in 5. The two cases of delayed conduction occurred after the first injection in patients with previously normal electrocardiograms. Blood pressure changes were noted as early as 10–15 minutes after the first intravenous injection, both systolic and diastolic readings being diminished by 5–10 mm. Hg.

On the other hand, patients showing considerable myocardial lesions prior to emetine medication did not suffer any deterioration after the first and sixth injections. In the last group, comprising 15 cases, the same investigations were repeated under the influence of exertion. An electrocardiogram was taken, and blood pressure estimated, before and immediately after exercise as previously, before the first, after the sixth, and after the twelfth intravenous emetine injection, so as to detect functional changes which might escape notice if patients remained at rest. These resulted in a diminished height-"voltage" of R in six, an increased "voltage" in one, and a lowering of T in one or more leads in nine. In five cases the height of the T-waves increased after six injections. Thus no change occurred in one, some deterioration in nine and some improvement in five. None of the myocardial lesions, which appeared during treatment, was brought to light by the exertion test; all of them were already manifest at rest and were merely accentuated by exertion.

There appears to be no divergence of opinion about the cardiac action of emetine in experimental animals—an overdose causing ventricular fibrillation in rabbits.

BROWN of the Mayo Clinic [this *Bulletin*, 1936, v. 33, 542] doubts whether untoward cardiovascular reactions are frequently seen in man, as none had occurred in 554 cases of amoebiasis in 15 years' clinical experience, and the author's experiments seem to prove that 12-grain courses of emetine by the intramuscular route have no damaging effect on the myocardium, even if some myocardial defect exists at the commencement of the medication. The only patient who suffered some deterioration was the only one whose dysentery did not respond promptly to the treatment. The explanation of these observations seems to be that the positive effect upon the heart, exerted by improvement of the intestinal and general condition under emetine, prevailed over a possible negative emetine effect on the heart muscle.

On the other hand, the results of intravenous emetine administration confirmed the fact that, by exceeding a certain emetine concentration, either in a single dose, or by cumulative action, signs of a myocardial lesion could be produced.

The pulse rate remained constant in the immediate (short range) experiments and during the emetine course varied mostly according to the cardiographic changes. The behaviour of the blood pressure cannot be taken as an indication of a toxic emetine effect on the heart-muscle, provided that the electrocardiogram is regarded as a reliable mirror of the myocardial condition.

Changes of the size and shape of the heart, such as are to be seen in carefully traced orthodiagrams, were negligible in the course of intramuscular or intravenous emetine administrations.

[This paper is illustrated by reproduction of electrocardiograms to which reference is made in the text. Unfortunately they are so reduced that it becomes impossible to follow the changes in the waves described in this paper and they are therefore useless for future reference.] *P. Manson-Bahr.*

INDIAN MED. GAZ. 1943, Sept., v. 78, No. 9, 443–5. **The Toxicity of Emetine.**

The only real indication for the use of emetine is clinical evidence, supported by laboratory findings, of infection with *Entamoeba histolytica*. In spite of the fact that it is generally conceded that much, if not most, dysentery is not amoebic, it frequently happens that emetine is given empirically, and it is also frequently the case that faeces examinations are performed by inexperienced laboratory workers. From the clinical aspect there can be no doubt that emetine is a toxic drug with a cumulative action, and on that account the dosage and period of administration have to be controlled. It is hoped that the days of excessive doses have gone.

NAPIER [in a book on Tropical Medicine in the press] has expressed his conviction that "the most disastrous consequences may result from the ill-advised administration of emetine." "During the 1914–1918 war, the writer saw many examples of inexperienced medical officers giving two and even three grains of emetine daily for long periods and literally killing their patients, of whose fate they were often quite unaware on account of the frequent evacuations from hospital that are inevitable in war time."

"The most dangerous and important effect is on the heart in which it produces myocardial degenerative changes and alterations in conductivity with a fall of blood pressure, cardiac irregularity, and acute dilatation as the result of any undue effort."

At present the dose of emetine is limited to 1 grain a day and the days of long-continued administration for several weeks have now, it is hoped, also gone. The course now usually consists of not more than 12 injections, often 9, or even 6.

Are the limited doses for limited periods toxic? Most of the evidence on this point is based on experimental work on animals. SOLLMANN (*A Manual of Pharmacology and its Application to Therapeutics and Toxicology*, 1942, Saunders, Philadelphia) stated that "the effective dosage of emetine seriously overlaps the toxic range (LEAKE, 1932); indeed toxic phenomena occurred from effective treatment in 80 per cent. of the monkeys used (DOBELL and BISHOP, 1929). Excessive use is followed by accentuation or recurrence of diarrhoea, sometimes by nausea, peripheral palsy, oedema from renal damage, weakness and irregularity of the heart."

"Emetine hydrochloride is toxic for most animals, including man, with 10 to 35 mg. per kg., hypodermically (Leake, 1932)."

The single therapeutic dose of 1 grain is, in a 10 stone man, 1 mgm. per kilo., and is well within the limits of safety from toxic effects.

A special study of the matter was undertaken by BROWN [this *Bulletin*, 1936, v. 33, 542] in the Mayo Clinic in 554 cases with emetine hydrochloride, and recorded toxic effects in 23, most commonly peripheral neuritis. He also stated that he had traced 37 reported cases of toxic effects produced by emetine, and that 10 deaths had been reported.

"Thus it may be taken that the ordinary therapeutic course of emetine is accompanied by a certain amount of risk or toxic effects, but that the risk is not a very serious one provided that certain precautions are taken. Most authorities recommend that during the period of emetine administration the patient should be kept in bed and that exertion should be reduced to a minimum."

SOLLMANN (*loc. cit.*) states "Local and gastro-intestinal effects are relatively mild or absent with hypodermic injections of the ordinary therapeutic doses of emetine hydrochloride. Larger doses produce some nausea, vomiting, depression and pain. Even 0·25 gm. in a single dose caused only persistent nausea (ALLAN). Cephaeline is more emetic. If emetine solution should accidentally touch the conjunctiva, it is very irritant (BLUE, 1915). Bloody diarrhoea, in consequence of therapeutic hypodermic emetine injection, is probably more common than was formerly supposed; it may be mistaken for recrudescence of the dysentery."

There seems to be considerable unanimity of opinion, except in the matter of the heart affection. There appears to be no difference of opinion regarding the fact that emetine administration may cause some disorder of the heart's action, mainly a tachycardia. Some have attributed this to actual myocardial damage: others have suggested that it is due more to vagus irritation than to myocardial affection.

The paper by HEILIG and VISWESWAR (see above) is interesting and, no doubt, accurate. It is, however, in marked contrast to the reports of other workers. The authors suggest that the lack of toxic effects may have been due to the absence of cephaeline in the preparation they employed, but it may be taken that all good brands of emetine are free from cephaeline.

*P. Manson-Bahr.*

GHOSH, B. N. & ADHYA, P. C. **Some Newer Observations on the Pharmacology of Emetine.** *J. Indian Med. Ass.* 1943, Nov., v. 13, No. 2, 37–40, 7 figs. [13 refs.]

"1. Emetine hydrochloride depresses the heart, the auricles being more depressed than the ventricles. The effect is on the musculature and not on the nervous mechanism.

"2. It produces a fall in blood pressure due to the depressant effect on the heart. Direct action on the vessel-wall appears improbable. The central depression might partially contribute to the fall in pressure.

"3. Therapeutic doses produce slight stimulation of the intestinal movements and also slight congestion of the intestines. Large doses depress intestinal musculature.

"4. It does not directly stimulate the vomiting centre in the medulla.

"5. It has no effect on the uterus and, therefore, it is not likely to induce abortion, as has been generally believed."

RAVELO-BARRÉ, M. & THOMEN, L. F. **Incidence of Protozoan Parasites of the Human Intestine in the District of Santo Domingo, Dominican Republic.** *Amer. Jl. Trop. Med.* 1943, Mar., v. 23, No. 2, 243–6, 1 graph.

In the national laboratory of Santo Domingo 500 faecal specimens submitted for examination for helminthic ova or larvae were also studied from the point of view of protozoal infections. Though in some cases the specimens were too old for satisfactory examination for protozoa, 52·2 per cent. were positive. The incidence of *E. histolytica* was 14 per cent., that of *E. coli* 34·3, and of *E. nana* 18·2. The somewhat remarkable claim is made that all the *E. histolytica* infections were of the "small" race, and that, though a search for the "large" race was made, none was found. *C. M. Wenyon.*

WESELMANN, H. Ueber die Bedeutung des Vorkommens von Lamblien im Duodenum und im Gallenwegssystem. [**The Presence of Giardia in the Duodenum and in the Gall Bladder.**] *Deut. Militärarzt.* 1943, Apr., v. 8, No. 4, 204–7.

Illustrating his remarks by reference to two cases of Giardia infection, the author advises that in all cases of long standing and refractory gastroenteritis examination for these parasites should be carried out by duodenal tubage. The two patients mentioned had suffered for many months from distressing abdominal symptoms, which no form of treatment was able to relieve. Finally, a diagnosis of Giardia infection was made. Elimination of the infection by means of acranil was followed by recovery. The author states that in some cases symptoms referable to the gall bladder occur, though he admits that only in very rare cases has the presence of Giardia in this organ been recorded. Failure to exclude a Giardia infection has often resulted in surgical interference with the gall bladder without removal of the primary seat of infection. [Acranil, formerly called Sostol, is a hydrochlorate of an acridinic compound. See also DE MURO, this *Bulletin*, 1940, v. 37, 378, and GROTT, *ibid.*, 379.] *C. M. Wenyon.*

RUIZ SÁNCHEZ, F. Flagelados intestinales en Guadalajara. [**Intestinal Flagellates in Guadalajara, Mexico.**] *Medicina.* Mexico. 1943, Aug. 10, v. 24, No. 441, 312–23.

In a hostel in Guadalajara, Mexico, occupied by young refugees from 5 to 17 years of age, chiefly from the Pacific Coast, the author carried out a survey for intestinal flagellate infections, which were determined by the microscopic examination of faecal specimens obtained after a saline purge. In all 380 persons were examined; the results, in four age groups, are as follows:—

| Age | Examined | Infected | Trichomonas | Giardia | Chilomastix |
|---|---|---|---|---|---|
| 5 | 20 | 17 | 50% | 25% | 10% |
| 6–9 | 162 | 83 | 26·5% | 23·4% | 1·2% |
| 10–13 | 154 | 40 | 13·6% | 10·4% | 1·9% |
| 14–17 | 44 | 10 | 15·9% | 4·5% | 2·3% |

This high incidence suggests that the sanitary arrangements in the hostel are in need of revision. *C. M. Wenyon.*

KIRBY, H. **Observations on a Trichomonad from the Intestine of Man.** [Research Notes.] *J. Parasitology.* 1943, Dec., v. 29, No. 6, 422–3, 1 fig.

The author remarks that there is a growing tendency to regard all the trichomonads found in the intestines of man as belonging to one species which has a variable number of flagella. The name for this species is, according to some observers, *Pentatrichomonas hominis* (Davaine), and, according to others, *Trichomonas hominis* Davaine. The author has studied in culture a five-flagellated trichomonad isolated from the human intestine, and has come to the conclusion that the arrangement of the five flagella justifies the view that this form is a species distinct from others found in the human intestine, and that the name *Pentatrichomonas hominis* (Davaine) can reasonably be retained for it, though he admits that we can never know what was the actual structure of Davaine's flagellate. The distinguishing features of the form studied by the author are the origin of four of the anterior flagella from an anteriorly directed column 1 to 2$\mu$ in length, and the independent origin of a short fifth flagellum from a point about 1$\mu$ posterior to the root of the column on the side of the body opposite to that on which the undulating membrane begins. It is considered that the arrangement of the independent flagellum is a new feature in the organization of these flagellates, and that a distinct generic name is called for. *C. M. Wenyon.*

SOPER, H. W. **Pathogenicity of Intestinal Protozoa.** *Amer. J. Digestive Dis.* 1943, Oct., v. 10, No. 10, 366–8, 3 figs.

The author maintains that various intestinal protozoa usually regarded as non-pathogenic are actually able to cause intestinal derangement, particularly of the lower part of the small intestine. Certain forms of ileitis are said to be the result of trichomonas infection, which is only detectable during the acute phase of the complaint. Stovarsol treatment is spoken of as an almost infallible remedy for all these infections, except that due to giardia, which responds readily to

atebrin. It must be admitted that the evidence in favour of pathogenicity of *Entamoeba coli*, trichomonas and chilomastix is far from convincing. *C. M. Wenyon.*

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## RELAPSING FEVER AND OTHER SPIROCHAETOSES.

GREIG, E. D. W. **An Epidemic of Relapsing Fever in Edinburgh in 1843.** *Edinburgh Med. J.* 1943, v. 50, No. 11, 681–6. [11 refs.]

The author recalls the epidemic which led CRAIGIE to name the disease relapsing fever, and from contemporary accounts has compiled a description of the clinical details. One point in the epidemiology is particularly interesting, namely that it was noted that laundry women were frequently infected after washing the clothes of the patients.

Greig points out that war and post-war conditions are particularly favourable to the spread of louse-borne diseases, and notes that relapsing fever, as well as typhus, was very prevalent in the Balkans and Eastern Europe in the war of 1914–18. *Charles Wilcocks.*

SERGENT, A. & RICHARD, H. *Spirochaeta hispanica* peut persister plus de deux ans dans le cerveau d'un cobaye inoculé expérimentalement. [*Spirochaeta hispanica* **can persist for more than Two Years in the Brain of a Guineapig Inoculated Experimentally.**] *Arch. Inst. Pasteur d'Algérie.* 1942, Dec., v. 20, No. 4, 293–7, 1 chart.

An account of experiments, performed in 1936, on the persistence of latent infections of *S. hispanica* in the brains of guineapigs after clinical recovery.

The guineapigs were infected with an Algerian strain of *S. hispanica* maintained either in *Ornithodorus* or *Rhipicephalus*, and were killed at various intervals after apparent recovery, ranging from four months up to two years. The guineapigs were killed by total bleeding, and the brain removed and carefully washed in saline in order to get rid of any traces of blood. Then each brain was emulsified in 10 cc. of saline and inoculated into normal guineapigs.

The results indicate considerable individual variation in the persistence of latent infections; in some cases these had disappeared within four months of infection, but in others residual brain infections were found in guineapigs more than two years after the original attack.

The incubation period of the infections produced by the inoculation of brain tissue was found to be longer (average 8½ days) than when spirochaetes from an acute attack were used (average three days); the resultant attacks, however, were of similar duration with both sources of infection. *E. Hindle.*

CHORINE, V., GRABAR, P., TIXIER, R. & CROUGUE, O. Ultrafiltration de *Spirochaeta hispanica*. Détermination des diamètres des formes visibles et des formes infravisibles. [**The Ultra Filtration of** *Spirochaeta hispanica*. **Determination of the Diameter of the Visible Forms and of the Invisible Forms.**] *Ann. Inst. Pasteur.* 1943, May–June, v. 69, Nos. 5–6, 162–70, 1 chart. [11 refs.]

A record of filtration experiments with *S. hispanica*, using collodion filters [see HINDLE and ELFORD, this *Bulletin*, 1933, v. 30, 723] in

order to determine whether there was any difference in the filterability of the so-called invisible stage of the spirochaete and the ordinary spiral form.

The authors used guineapigs infected with *S. hispanica* by the bites of *Ornithodorus erraticus*. The plasma of the infected animals was diluted 1/10 in Tyrode's solution, without calcium salts, and containing 1·5 per cent. sodium citrate. The suspension was passed through collodion membranes with porosities of $500 \pm 70$ m$\mu$, filtered under a pressure of 1/4 atmosphere. To test adsorption the filtrate of a rich suspension of spirochaetes was collected in 10 successive fractions of 2 to 6 cc. and each examined to see how many organisms it contained. The results are given in the form of a curve and show that with a suspension containing 1,360,000 organisms per cc. there was considerable adsorption in the earlier fractions, nearly all the spirochaetes being retained by the membrane, and it was only the 20th to 25th cc. of the filtrate that gave a concentration equal to the original suspension.

The number of spirochaetes in the blood of guineapigs at different stages of the infection is known to vary enormously, and blood was collected and filtered not only during the attacks when spirochaetes are very numerous, but also during the intervals between the attacks when it is usually impossible to detect them by microscopic examination. The filtrates were examined both microscopically and also tested for infectivity by inoculation into normal guineapigs.

The results show that the typical spiral form of *S. hispanica* is stopped by membranes with an average porosity of $424 \pm 22$ m$\mu$, but passes through membranes of $500 \pm 70$m$\mu$ porosity, which indicates a diameter of about 210 to 250 m$\mu$.

The invisible forms collected during the intervals between febrile attacks were also stopped by membranes of $424 \pm 22$ m$\mu$ porosity and passed through those of $541 \pm 28$ m$\mu$ porosity. Their diameter, therefore, would be approximately the same as the ordinary spirochaetal form, namely 210 to 270 m$\mu$, but the authors remark that the invisible forms seemed to pass through the membrane with rather more difficulty than the typical spiral forms. As a result it is evident that the failure to detect spirochaetes in the blood during these negative, though infective, phases cannot be explained by the presence of very slender forms. Either the infective organisms are more or less typical spirochaetes so few as to escape detection, or are much shorter than the typical forms and consequently resemble the granules generally present in serum. *E. Hindle.*

ROBINSON, G. G. **The Use of a Plaster Substratum for testing Pyrethrum-Oil Films against** *Ornithodorus moubata*, **Murray (Acarina : Argasidae).** *Bull. Entom. Res.* 1943, Dec., v. 34, Pt. 4, 269–77, 4 figs.

A solution of pyrethrum in oil is an effective insecticide for use against *Ornithodorus moubata*, the vector of relapsing fever in Central Africa. In addition to killing by direct contact, spraying with this liquid leaves a film toxic to ticks which subsequently walk over it. In a laboratory investigation of the efficiency of films produced by solutions of various compositions, plaster models were prepared and ticks put on them after they had been sprayed. In Africa the ticks normally infest the huts of natives and the model was used as an approximation to the dried mud of the floor or walls.

Solutions of 0·2 to 0·4 per cent. Pyrethrin I [? about 0·4 to 0·8 per cent. *total* pyrethrins] were used with deposits of 0·3 to 2 mgm. per sq. cm. A partial or complete mortality was obtained after the ticks had been on the treated surfaces for four days at 28°C. and 50 per cent. relative humidity. The insecticide was most effective if applied :—

1. Concentrated rather than dilute.
2. In a medium rather than a light petroleum oil.
3. As an emulsion in Lanette Wax solution rather than in oil alone.
4. With an irritant (such as 4-chlor-2-methyl-phenol) present in the solution.

*J. R. Busvine.*

LOURIE, E. M. & COLLIER, H. O. J. **The Therapeutic Action of Penicillin on** *Spirochaeta recurrentis* **and** *Spirillum minus* **in Mice.** *Ann. Trop. Med. & Parasit.* 1943, Dec. 31, v. 37, Nos. 3 & 4, 200–205.

A record of experiments on the effect of penicillin on infections of *Spirochaeta recurrentis* and *Spirillum minus* in mice.

When mice infected with *S. recurrentis* were injected each with a single dose of 250 units of the calcium salt subcutaneously, or with five doses of 50 units at hourly intervals, the spirochaetes usually disappeared from the blood within 24 hours. Neoarsphenamine in doses of 1 mgm. subcutaneously produced the same result. In most cases, however, the parasites reappeared within a month, no matter which drug was used for treatment. [Recent work by MAHONEY, ARNOLD and HARRIS (*Amer. J. Pub Health*, 1943, v. 33, 1387) indicates that penicillin treatment may be most valuable in syphilis.]

In the case of infections of *Spirillum minus* in mice, doses of 10 units of the calcium salt of penicillin administered subcutaneously (1/650 of the tolerated dose of the sodium salt) caused the disappearance of the parasites from the blood within 24 hours, whilst in the case of neoarsphenamine 1/2 to 1/4 of the tolerated dose was required to produce the same effect. Further experiments showed that penicillin was much more efficient when given in a series of fractional doses than in a single injection ; mice were cured by an aggregate of 100 units by the former method but 1,000 units were required when given in one dose.

Penicillin had no action against infections of mice with *Trypanosoma rhodesiense*, *T. congolense* or *T. cruzi*, or on *Plasmodium relictum* infection in canaries.

The potential superiority of penicillin over neoarsphenamine in the treatment of these spirochaetoses raises the question as to whether this drug may not be effective against syphilis. [An editorial note in *J. Amer. Med. Ass.*, 1944, v. 124, 99, states that HEILMAN and HERRELL have obtained good results with penicillin (1,000 units) in mice infected with *Sp. novyi*. Of 26 treated mice only 1 died, but in the control group 21 of 27 died. Only 4 of the surviving treated mice had relapses. No reference to a published account of this work is given.]

*E. Hindle.*

SYMONDS, J. W. C. **A Case of Rat-Bite Fever.** *J. Roy. Army Med. Corps.* 1943, Dec., v. 81, No. 6, 288–90.

The record of a case of rat-bite fever in a professional rat-catcher, who carried out this work in a military hospital and had been bitten about a dozen times without any untoward result. However, 14 days

after a recent bite he was admitted to hospital with fever and an inflamed indurated swelling at the site of the wound. During the next few days his temperature rose to 103°F. and then the symptoms and signs abated. The only treatment given was sulphanilamide by mouth and local applications of heat to the wound.

The fourth day after admission the enlarged axillary gland was aspirated and the culture of the fluid obtained grew *Streptobacillus moniliformis*. This organism has only occasionally been isolated from human cases of rat-bite fever in Britain, although it is a common inhabitant of the nasopharynx of both laboratory and wild rats. The clinical symptoms produced seem to be indistinguishable from those following infection with *Spirillum minus*, and the possibility of its occurrence must be borne in mind in cases of rat-bite fever [see also this *Bulletin*, 1942, v. 39, 693]. *E. Hindle.*

MOESCHLIN, S. Lungeninfiltrate beim Ikterus infectiosus Weil. [**Lung Infiltration in Weil's Disease.**] *Schweiz. med. Woch.* 1943, Oct. 2, v. 73, No. 40, 1227–30, 2 figs. [16 refs.]

An account of three cases of Weil's disease showing infiltration of the lungs, which is considered to be a specific inflammatory process of the lungs.

There was a noticeable contrast between the slight physical signs of this process and the wide shadows shown in the X-ray photographs. In all three cases the symptoms appeared at the beginning of the second febrile attack, and one of these patients developed a typical relapse. Spirochaetes, however, were not found in the sputum and none of the cases showed a haemorrhagic diathesis.

In another fatal case the autopsy showed severe dissociation of the liver cells and parenchymatous haemorrhages in the lungs, which would be the cause of the shadows seen in the X-ray photographs of the thorax. These haemorrhages are considered to be probably the result of a lack of prothrombin.

The author obtained good results in the treatment of the disease with convalescent blood ; in a severe case the transfusion of 400 cc. produced great improvement within 24 hours. *E. Hindle.*

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## YAWS.

DE WYTT, W. H. H. J. **The Diagnosis and Treatment of Yaws among West African Troops.** *J. Roy. Army Med. Corps.* 1943, Dec., v. 81, No. 6, 255–62.

A study of 72 Kahn positive cases in four months [a brief and limited acquaintance with the disease]. Seventy cases were regarded as tertiary and 43 were described as foot-yaws. [Inadequate account is taken by the author of existing knowledge, and it might be pointed out that the Kahn reaction is of little or no value in diagnosis in a community where yaws is rife.]

There are brief descriptions of plantar and other lesions. Sobita (sodium potassium bismuth tartrate) was given in 1 grain doses in 2 cc. of distilled water for 12 weekly intravenous injections. Albuminuria occurred in some patients but in most it was only transient ; in

more persistent cases it cleared up on changing treatment to N.A.B. Clinical cure resulted in the majority; the average dose of Sobita producing this was 4·2 grains. The recurring nature of the foot lesions is stressed. Intravenous Sobita was used to provoke a positive serum Kahn. In two of 14 patients completing the 12 Sobita injections the serum Kahn became negative.

A note by EVANS and KNOCK [personal communication, 1943] on the pathology of yaws ulceration is included in the paper [presumably tertiary ulceration is intended]. In over half of 17 cases, Vincent's organisms were found, together with treponemata of the *refringens* type and others indistinguishable from *T. pallidum*. [This last finding is not usual in tertiary yaws lesions.] From the "pathological examination of the same series" it was concluded that peri- and endarteritis are less marked than in syphilis, and that yaws granulation tissue is more vascular.

The author stresses the military and economic importance of foot-yaws and the frequence of relapses after inadequate treatment. He advises that treatment be continued until the Kahn test is negative. [It should be borne in mind that most yaws treatment in Colonial administration is intended not so much to cure tertiary cases as to render secondary cases non-infectious.] *C. J. Hackett.*

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## LEPROSY.

STEINBERG, Isidoro R. & MENGONI, H. R. Lepra familiar. [**Familial Leprosy.**] *Primer Congr. Nac. Enfermedades Endemo-Epidémicas, Buenos Aires, 1942, Nov. 9–13.* 676–9. [10 refs.]

The authors define the term "familial" for their purpose as "more than two in close relation" such as parents, children and brothers. A study of 170 clinical histories has revealed only three such instances: (1) A girl with mixed leprosy whose father and two brothers had died of the disease; (2) Another girl similarly affected, three brothers leprous out of a family of 11; (3) Another girl whose mother was a leper and one brother had died of leprosy, seven others remaining apparently well.

The authors quote the findings of DE MOURA in Brazil in 1938 among 971 inmates of the San Roque leper colony: In 27·39 per cent. some other member of the family was attacked: father and mother 7·14; mother and brothers 6·67; father, mother and brothers 2·26; father and brothers 2·63; father, mother and sons 1·13; husband (or wife) and sons 1·13; wife, brothers and sons 0·37 per cent. [See this *Bulletin*, 1939, v. 36, 237.] Argüello PITT in 1942, in Córdoba, found only two instances among 72 investigated.

The authors then record another case of their own in the Hospital Muñiz, seen in 1941—a girl of 14 years with mixed lesions. She denied any contact with lepers or anyone suspected of being a leper. Examination of near relatives revealed a brother aged 17 affected, a sister aged 15 without observable lesions but with Mitsuda reaction positive, a brother aged 11 with tuberculoid leprosy, and another of 6 years with a suggestive lesion on the right thigh, macular with diminished sensibility. Mitsuda was negative and the nasal mucus showed no organisms, but biopsy was positive. *H. Harold Scott.*

FAGET, G. H. **Chronicity of Leprosy.** *New Orleans Med. & Surg. J.* 1943, Oct., v. 96, 138. [Summary taken from *J. Amer. Med. Ass.* 1943, Dec. 11, v. 123, No. 15, 998.]

Faget found among 380 inmates at the National Leprosarium in Carville, La., 5 with the neural type of leprosy who have had the disease for 53, 51, 48, 46 and 41 years respectively. Eighteen others, 14 with neural and 4 with mixed leprosy, have survived 30 to 40 years of leprosy, and 32 (19 neural and 13 mixed cases) have suffered from leprosy for 20 to 30 years. Thus a total of 55 patients, over 14 per cent. of the entire population of the National Leprosarium, show a chronicity of leprosy of over 20 years' duration. This chronicity is found chiefly in the neural type, for although neural leprosy exists in less than 30 per cent. of the total number of patients at the Carville leprosarium, 38 of the 55 patients (nearly 70 per cent.) who had survived leprosy for more than 20 years had the neural type.

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## HELMINTHIASIS.

GILBERT, B. **Schistosomiasis (Bilharziasis) of the Female Genital Tract and Neighbouring Tissues.** *J. Obstet. & Gynecol. of the Brit. Empire.* 1943, Oct., v. 50, No. 5, 317–36. [10 refs.]

The first part of this paper gives a general account of the discovery, anatomy, life history, mode of infection, general pathology and distribution in Europe of Schistosoma. One section deals with cercarial dermatitis due to the cercariae of species other than those which cause schistosomiasis. The author thinks that systemic infection by these species is possible, although it is not known. He refers to the work of PENNER who immersed a young rhesus monkey in water full of *Cercaria douthitti* and at autopsy six days later found the "worms" in the lungs. The cases reported from Cardiff by MATHESON, due to *Cercaria ocellata*, are mentioned [*cf.* also, SZIDAT, this *Bulletin*, 1944, v. 41, 57]. The author notes that FUJINAMI, NAKAMURA and NARABAYASHI found eggs of *S. japonicum* in the stools of three newly-born infants, so that congenital infestation is possible.

Dealing in detail with schistosomiasis of the female genital tract, the author, who writes from S. Rhodesia, says that in all his cases *S. haematobium* was the cause; *S. mansoni* was not found. A marked characteristic was the "colossal" fibrosis, which made surgical procedures very difficult. After describing the disease in the bladder, the author says that, although the general view is that the disease in the urethra is commoner in the male, we must remember that the incidence is less in the female. In the female urethra the disease is usually an extension from the bladder with similar tissue changes. The commonest clinical findings are thickening and ulceration of the mucous membrane and small papillomata, which may emerge from the external meatus and be mistaken for urethral caruncles; the latter are, however, usually on the posterior lip of the meatus, while bilharzial ones may protrude from any part of its circumference. Peri-urethral abscesses may cause urethral fistulae. Local thickening, when it is

palpated, feels like the infiltration of the anterior vaginal wall in advanced cases of carcinoma of the cervix uteri.

The ureters are often affected. The fibrosis here is apt to be patchy and is most marked below the pelvic brim. Bilharzial strictures of the ureters, one inch or more above their entry into the bladder, may need surgical interference. The peri-ureteral connective tissue may become stone-hard and very difficult to deal with.

There are few references to bilharzial disease of the ovary in the literature. SYMMERS (1906. *Studies in Pathology*, Quarter Centenary. Aberdeen University) described a case in a young child, in which there was a fibrous mass involving the upper edge of the broad ligament and the ovary; the ovary contained "Bilharzial ova". GIRGES, R. (1934. *Schistosomiasis*, Bale, Sons and Danielsson, London) refers to scarred and fibrous ovaries with a large number of eggs in the parenchyma. The ovaries may be covered with a thick fibrous coat which makes ovulation impossible. The author has seen and has operated upon several cases of ovarian bilharziasis associated with bilharziasis of other parts of the genital tract and thinks that the chances of finding the eggs in the ovary alone are very small; they would be of little interest because bilharziasis would probably be found elsewhere in the genital tract. There is also a small literature on bilharziasis of the Fallopian tube. A recent case has been described from Johannesburg in which the distal end of the Fallopian tube was greatly thickened and the mesosalpinx was filled by hard fibrous tissue. The eggs of Schistosoma were found in the Fallopian tube and adjacent broad ligament. The tubal changes had caused the arrest of a fertilized ovum. This marked thickening of the Fallopian tube, which may reach a diameter of an inch or more, and of the mesosalpinx, is a characteristic of the disease in these structures. GELFAND [this *Bulletin*, 1942, v. 39, 10] described two cases.

In Gilbert's own cases there has always been considerable involvement of the broad ligament. Two of them are described. Both were in native women. In the first case, in which pregnancy had never occurred, bilateral tubo-ovarian masses completely obliterated the pouch of Douglas and numerous loops of small intestine were adherent to them. The enlarged ovary of each side was covered with adhesions to the rectum and lateral wall of the pelvis. Gross thickening of the broad ligament was very marked and both Fallopian tubes showed marked thickening of all layers. Cystic spaces in the masses were full of brownish fluid and both ovaries showed cysts. Eggs of *S. haematobium* were found by "digestion" of the tissues in 10 per cent. caustic potash. The use of this fluid may be the only way of demonstrating the eggs. Abundant eosinophils were present in the affected tissues. The urine was examined only once, but eggs were not found.

The second case showed similar lesions on the left side only, *e.g.*, chronic fibrosis and abundant eosinophils. Eggs of *S. haematobium* were found in the tissues and also in the urine, but there were no eggs in the faeces. The author's experience is that bilharziasis of the Fallopian tube is a fairly common cause of arrest of a fertilized ovum in the Fallopian tube. He describes a case in a native woman of ectopic pregnancy due to schistosomal salpingitis. The patient had a history of a previous ectopic pregnancy probably due to the same cause. Another Rhodesian case, described to the author by R. M. HONEY, shows that the patients rarely know that they have been infested, that dysmenorrhoea tends to increase in severity and the pain of tubal

disease becomes continuous between the menstrual periods, that sterility, ectopic pregnancy and general malaise may all be clinical signs, but that the menstrual cycle may not be disturbed.

The uterus as a whole is not commonly affected, but treatment of its tissues with caustic potash may reveal bilharzial eggs ; they have been found in the endometrium in at least three cases in the literature, and also in the tissue of fibroids. Bilharzial ulcers and polypi of the vaginal cervix as far up as the internal os have been described, but no case has been recorded from Rhodesia.

In the vagina the disease is not uncommon and may be primary or an extension from the bladder ; the fornices are more often affected than the lower parts. In the vulva papillomatous masses closely resembling the confluent type of condylomata lata of syphilis, with ulceration in some cases, may occur ; they affect especially the vestibule, hymen and clitoris. The clitoris and external meatus may be destroyed. The disease may simulate, and co-exist with, epithelioma of the vulva. In the author's cases the papillomatous condition extended laterally to the genito-crural folds, back to and around the anus and forward to the top of the symphysis pubis. One case, in a child of 8 years, is described. Native mothers do not seek treatment either for themselves or their children until the condition has become so advanced that eggs are difficult to find. In the perineum advanced ulceration is usually found, with numerous sinuses. There may be a similar affection of the vagina, urethra or anal canal, but sometimes these are not affected. Eggs can be obtained from curettings of the ulcers and sinuses, which are often secondarily infected.

Discussing the clinical aspects, Gilbert notes that infestation usually occurs early in life. There are records of delay of the onset of the menses for as long as 22 years, or intervals of amenorrhoea lasting 3–6 months or more may occur, suggesting that the ovary is involved. Most of the author's cases had normal menses and he did not find the scanty loss and shorter duration of menstruation mentioned by GIRGES. He found that the menopause was not early, as it is said to be, but in many of his cases the ovaries were so much involved that they would probably have lost their function if they had been left in the body. Dysmenorrhoea is not so common as one might expect ; it generally means severe involvement of the Fallopian tubes and broad ligament. Dyspareunia is usual when the disease attacks the Fallopian tube, ovarian ligament and the broad ligament. Leucorrhoea is rare in the unmarried patient with tubal disease, and Gelfand (*loc. cit.*) suggests that its absence when there is a pelvic inflammatory mass is highly suggestive of bilharziasis. Pain is common in advanced cases, but is not so common in the early stages. Usually it is suprapubic and accompanied by low backache, but it may be sudden in the right or left iliac fossa and then may simulate an ectopic pregnancy. Frequency of micturition is common and there may be haematuria with eggs in the urine. Sterility may result from a mild as well as from a severe tubal bilharziasis. If a normal pregnancy occurs the foetus may die *in utero*.

Surgical treatment is usually needed. The urinary tract must be thoroughly examined by cystoscopy and ureteral catheterization. Intravenous antimony is given on alternate days, the adult dose being ½ grain for the first dose, gradually increased to a maximum of 2–2½ grains, until a total of 25–30 grains have been given. Although the

parasites and eggs may be killed by this, the fibrosis is not affected. [See also GIBSON, this *Bulletin*, 1926, v. 23, 245 ; GELFAND & OSBURN, *ibid.*, 1944, v. 41, 137] *G. Lapage.*

EAST AFRICAN MED. J. 1943, Sept., v. 20, No. 9, 287–8. *Schistosoma mansoni.* [Editorial.]

From June 1942 to June 1943, 185 cases of infection with *Schistosoma mansoni* have been recorded [in Kenya Colony ?] ; of these 24 were in Europeans, 23 in Asians and 138 in Africans. " In the streams in and near Nairobi, Mr. G. R. Cunningham-van-Someren has identified three varieties of such snails, *Bullinus tropicus*, *Lymnaea caillaudi* and *Biomphalaria pfeifferi*, as housing the ciliated miracidiums that hatch out from the schistosome eggs derived from the human patient, and in their turn give rise to the active cercarias that re-enter and infect man by burrowing through the skin."

The infection is one of the chief causes of rejection of army recruits ; partly for this reason and partly because of precautions that are taken, it has given little trouble in the Army in East Africa. *J. F. Corson.*

TRIM, E. A. **Infection with** *Schistosoma mansoni.* *East African Med. J.* 1943, Sept., v. 20, No. 9, 289–92.

In the author's opinion infection with *Schistosoma mansoni* should be regarded as a general disease since the toxins of the worm are carried in the blood and the eggs are distributed throughout the body and have been found in nearly every organ. The toxaemic period of the infection is illustrated by the case of a child [race not stated] infected near Nairobi. He was admitted to hospital with high fever, diarrhoea and acute abdominal pain ; the diarrhoea soon improved but schistosome eggs were not found in the faeces for over a fortnight. The toxaemic stage is not often seen in Africans.

The author has found that the presence of small, rather rubbery, discrete lymphatic glands in the groins and axillae is a useful indication of the infection.

The type of cirrhosis of the liver caused by this parasite seems to depend on the number and rate of deposition of the ova ; if the number is small and the rate slow, multilobular cirrhosis develops, while if the number is large and the rate rapid, periportal or pipe-stem cirrhosis results.

One patient had all the signs of subacute intestinal obstruction and laparotomy was performed. A small amount of clear, straw-coloured fluid was found in the peritoneal cavity, the liver was dark, cirrhotic and shrunken, and the mesentery was covered with white nodules varying in size from that of a marble to that of a hen's egg. Two of these masses were pressing on the descending colon just below the splenic flexure and causing the obstruction. The appearances suggested a generalized carcinomatosis but microscopical examination showed many shrunken eggs in the tumours, the condition being bilharziasis of the peritoneum. *J. F. Corson.*

NEGHME, A. & OSSANDON, M. **Ectopic and Hepatic Human Fascioliasis.** *Amer. J. Trop. Med.* 1943, Sept., v. 23, No. 5, 545–50, 3 figs. [14 refs.]

The authors report from Chile a case in which an immature fluke, diagnosed as *Fasciola hepatica*, was found in the subcutaneous tissue over the right eighth rib; the patient also had eggs of *F. hepatica* in the faeces, and the presence of another mature fluke in the liver was inferred, although no signs of it were found when an operation for cholelithiasis was performed.

The patient was a woman aged 52, who had had dyspepsia for 10 years. For six months before she was seen she had had repeated hepatic colic and a persistent pain in the right hypochondrium. There was an eosinophilia of 9 per cent. After a diagnosis of cholelithiasis, operation showed that the gall bladder and ducts were normal. The appendix was removed and the patient's condition improved; but, 21 days after the operation, an inflammatory painful infiltration was noted at the level of the right eighth rib; this became hard, non-fluctuating and adherent to the skin, being then rounded and about 5 cm. in diameter. Within it were three harder zones of a more purplish colour. It was excised and a parasite was found in it, which was diagnosed as *F. hepatica* by the characteristics of its parenchyma, and by the presence of sections of its digestive tract, excretory ducts, ventral suckers and spines in the cuticle; no eggs were present in it. Good photographs of it are reproduced. Around it there was an exudative inflammatory infiltration of the tissues with abundant lymphocytes, plasma cells, polymorphonuclears in groups undergoing disintegration, histiocytes and giant cells. Examination of the faeces showed the presence of eggs of *F. hepatica*, a photograph of which is reproduced. This faecal examination was repeated a week later to exclude the possibility of the first positive being due to the eating of infected sheep liver, but it was again positive. It was inferred that there was another mature fluke in the liver. The authors suggest that both these flukes were of the same age and that the one in the skin arrived there by direct migration through the peritoneal cavity rather than through the blood stream. This is in accord with the modern view that flukes reach the liver by migration through the peritoneal cavity and not by way of the bile duct.

The patient's condition improved after a course of daily injections of 0·08 gm. of emetine hydrochloride up to a total of 9·72 gm. [*sic*, see below]. The eosinophilia disappeared and eggs were no longer found in the faeces. [The recognized dose of emetine hydrochloride is ½–1 grain (0·02–0·06 gm.), a total of not more than 10–12 grains being given in one course; if a second course of injections is required an interval of a month should be allowed, as the drug is cumulative. The dosage given in this paper suggests that a mistake in the figures may have occurred.]

The literature on the rare occurrence of *F. hepatica* in man is briefly reviewed. In 1939 MANCEAUX and ALCAY [this *Bulletin*, 1939, v. 36, 626] collected 122 cases in the world literature. KOURI *et al.* [*ibid.*, 1939, v. 36, 626] reported 25 cases in Cuba. References to six Chilean cases are given. In 1942 the present authors found a case at necropsy and CROIZET (personal communication) found another. DISS [*ibid.*, 1937, v. 34, 867] could find only eight cases in the world literature of the ectopic localization of *F. hepatica*. [For other records of Fasciola

infection of man see BERGE *et al.*, this *Bulletin*, 1942, v. 39, 703, and D'ALLAINES *et al.*, *ibid.*, 1943, v. 40, 472.] *G. Lapage.*

PODYAPOLSKAYA, V. P. [**Diagnosis of Helminthic Infestations by the Examination of Scrapings from the Perianal Folds.**] *Med. Parasit. & Parasitic Dis.* Moscow. 1943, v. 12, No. 1, 83–5, 1 fig. [In Russian.]

The point emphasized by the author is that, while the method of taking scrapings from the perianal folds is widely practised in the Soviet Union and elsewhere for the diagnosis of enterobiasis, it is also valuable for the detection of the eggs of *Taenia saginata*, because the segments of this tapeworm may crawl out of the anus and, wherever they crawl, they leave behind a milky-white track in which multitudes of eggs may be found. They do this, for example, in a Petri dish. SHTROM showed that when the proglottid of this species shortens, eggs are expelled from it. Scrapings of the walls of the lower end of the rectum (*i.e.* examination of rectal mucus) may also detect helminth eggs. The scrape method depends on this characteristic crawling habit of the proglottids of *T. saginata* and would not apply to those of *T. solium*. Only 1 per cent. of the author's 586 patients were infested with *T. solium*; this species is excluded from his data.

Tests of the scrape and other methods made by Russian authors (the literature list is entirely Russian) are briefly summarized. Some of these authors strongly recommend the scrape method. The author's 586 patients, all males, were infested with *Ascaris lumbricoides* (38 per cent.), *Trichuris trichiura* (75·3 per cent.) *Enterobius vermicularis* (25·8 per cent.), *Taenia saginata* (42·7 per cent.) and *Hymenolepis nana* (1·5 per cent.). The actual technique of the scrape method used is not described, but it was compared with "Fülleborn's method" of examination of the faeces. A diagram of the results shows that the scrape method was better for the detection of Enterobius and *T. saginata*, but faecal examination was better for the detection of Trichuris, Ascaris and Hymenolepis. The following are the percentages of infestations detected by the author :—

| | Scrape method | Faecal examination |
|---|---|---|
| Enterobius ... ... ... | 94·7 | 10·6 |
| *T. saginata* ... ... ... | 76·0 | 57·2 |
| Ascaris ... ... ... | 43·5 | 97·7 |
| Trichuris ... ... ... | 13·6 | 97·7 |
| Hymenolepis (9 cases only) ... | 0·0 | 100·0 |

*G. Lapage.*

DE MEILLON, B. & LEECH, R. B. **A Sparganum from an East African Native.** *South African Med. J.* 1943, Sept. 25, v. 17, No. 18, 289–90, 1 fig.

After giving a brief account of the characteristics of spargana and the life history of these worms, the authors note that most cases of human sparganosis have been found in Indo-China, China and Japan [*cf.* BONNE, this *Bulletin*, 1943, v. 40, 553]. One case is reported by

SAMBON [*J. Trop. Med. & Hyg.*, 1907, v. 10, 117] in a native of the Masai tribe in British East Africa. The authors here record another African case.

The patient was a Muganda man, aged about 40. Admitted to hospital for right inguinal hernia, operation revealed three or four small nodules in the connective tissue round the spermatic cord as it left the external inguinal ring to enter the scrotum. Two or three of these nodules contained caseous material; one contained a white worm 5–10 cm. long and another some shorter pieces. This last was examined at the South African Institute for Medical Research. Pieces of an unsegmented ribbon-like worm, ½ to 2½ cm. long and about 1 mm. wide were found; histological examination showed them to be Sparganum and this diagnosis was confirmed by ORTLEPP at the Veterinary Research Laboratories, Onderstepoort.

So far three species of Sparganum have been recorded from Africa, namely, *Diphyllobothrium erinacei*, *D. theileri* and *D. pretoriense*, but the latter two species have been recorded only once. The authors suggest that other species may be found in Africa.

The patient was born at Entebbe and had spent all his life within twenty miles of that place. His diet consisted of sweet potatoes, beans, ground nuts, "matoke" (banana) with some beef, lake fish and possibly large edible rats. No other nodules could be found except enlarged lymph glands in the left groin, one of which was examined and showed chronic inflammation. The authors consider that sparganosis may be commoner in Africa than the records suggest, diagnosis being difficult unless the worms can be found. MUELLER and COULSTON [this *Bulletin*, 1942, v. 39, 89] state that positive skin tests can be obtained with antigen made from cysticerci of other tapeworms (cysticerci of *Taenia pisiformis* of rabbits and *T. taeniaeformis* of rats and mice). Possibly the cysticerci of *T. solium* and *T. saginata* might also give suitable antigens. *G. Lapage.*

FONT, J. H. *Syngamus laryngeus* **in Man. Report on Three Additional Cases from Puerto Rico.** *Bol. Asoc. Med. de Puerto Rico.* 1943, Sept., v. 35, No. 9, 331–3, 1 fig. [10 refs.]

Referring to earlier records of the occurrence of Syngamus (mostly infections with *S. laryngeus*) in man and in cattle and sheep, the author briefly describes the worms and states that the mode of infection is not known; the intermediate host, if any exists, of the syngamids of mammals has not been found. Man is an accidental host of *S. laryngeus*, which lives in the upper respiratory tract, whereas *S. trachea* (of the fowl) lives in the trachea and bronchi. Attached to the nasopharynx, *S. laryngeus* causes violent coughing; there may be blood-stained saliva and crawling sensations tantalizing to the patient. The Y-shape of the red male and female worms *in copula* may resemble a dilated capillary. In 1936 the author removed such a pair of worms from the right choana of a woman aged 33, with immediate cessation of the symptoms and in 1938 another pair, with similar results, from the oropharynx of a young white woman, who had lost 20 lb. in weight in six weeks, because the coughing had interfered with eating and sleep. Recently the author was consulted about another case, in which the worms were attached to the left arytenoid of a young man; removal cured the case.

The author does not think that *S. laryngeus* ever descends in man to the trachea or bronchi. *G. Lapage.*

DICKSON, J. G., HUNTINGTON, R. W., Jr., & EICHHOLD, S. **Filariasis in Defense Force, Samoan Group. Preliminary Report.** *U.S. Nav. Med. Bull.* 1943, Sept., v. 41, No. 5, 1240–51.

The authors are the members of a Board created by the Commanding General with instructions to study filariasis in the native population of the Samoan islands and the danger of communication of this disease to the troops quartered there. They find that there is considerable risk of infection of the troops and that infection has, in fact, occurred. The very characteristic type of lymphangitis which has been common in troops in this area should be regarded as filarial. The authors think that, while there remains some doubt whether *Wuchereria bancrofti* is pathogenic, the evidence that they bring forward is strongly in favour of the orthodox view that it causes the disease. They make recommendations for the diagnosis, treatment and prevention of filariasis, and consider the question of its effect on morale.

Studying the prevalence of filariasis among the natives of Tutuila, one of the authors had previously found that 251 (13·6 per cent.) of 1,839 natives showed microfilariae in thick blood films; 4 (1·6 per cent.) out of 244 children aged five years or under also had microfilariae in their blood; very few of these children were under one year old. The average time of exposure of the children was about three years.

It is probable that the actual percentage of the population infected is much higher, because there is little chance of finding the microfilariae in the blood unless there are large numbers in the circulation. Fibrosis, inflammation and other unknown factors may hinder access of microfilariae to the tissues and blood. The number of adult male and female filariae present in the tissues may be considerable before there is a chance of mating for the production of microfilariae and there may be infections with single male or female filariae; adults are prone to die and disintegrate; and even if only one mosquito bite in 10,000 resulted in transmission of a filaria, it seems likely that few, if any, Samoans would grow up free from the infection.

Failure to find the parasite in the blood of the troops does not mean that they are not infected. They have plenty of opportunity to become so. They have to be quartered in native villages and have to do much building, clearance of brush, laying of telephone lines, as well as night and day marches in areas near to native dwellings; moreover, the troops and natives show a desire for friendly and close contact.

The authors obtained evidence of actual infection in troops by dissecting lymphatic tissue removed from 17 cases of *mumu* or acute lymphadenitis or lymphangitis, which BUXTON and DURKIN *et al.* believed to be the earliest sign of filariasis. In six of these cases, either adult filariae or fragments of them were found (in two the worms were alive). One of these patients had been only five months in the area, another had been there 9½ months and had never been in the tropics before.

The authors have discussed in an earlier report [presumably unpublished] the clinical characteristics of the lymphangitis which they regard as being filarial. In that report they emphasized that the disease was seen only among those who have been five months or more in the area, that the lesions occurring in an arm or leg usually began with lymphadenitis and continued as retrograde or centrifugal lymphangitis, that there was a highly characteristic scrotal lesion with funiculitis, that there was a tendency to multiple involvement and recurrence, and

that there were no severe constitutional symptoms. Their hospital experience to date suggests that the scrotal structures are the commonest site (funiculitis, epididymo-orchitis and oedema of the scrotal skin). Thus Table I shows that out of 251 patients 185 had scrotal lesions and of these 57 (30·8 per cent.) had lesions of the arm or leg also. Lesions of the leg were relatively rare, possibly because the troops wear long trousers which protect their legs; they occurred in 17 [the table shows 18] patients out of 251, and in all but seven of these other structures were involved. Doubtful cases were excluded from these figures. BUXTON also found that scrotal lesions were the commonest and that they were always bilateral, but he found that the leg was more often involved than the arm, possibly because mechanical factors favour oedema in the leg, and because the native legs are not protected from bites.

Mental depression was a striking feature of the disease, as O'CONNOR also noted, and it persisted after the good prognosis was explained to the men, so that the authors think it may not be entirely psychological.

Skin tests were done with antigen prepared from *Dirofilaria immitis*, because there was not enough material of *W. bancrofti*. Details of the preparation of the antigen, and of the technique, will be published later. A table gives the results of skin tests done on 137 patients and 128 controls. Of the 137 patients 83·1 per cent. gave both positive immediate and delayed reactions; 1·7 per cent. gave positive immediate and negative delayed reactions; 12·3 per cent. gave negative immediate and positive delayed reactions; and 2·6 per cent. gave negative immediate and doubtful delayed reactions. Tests with extracts of *Ascaris lumbricoides* showed some cross reactions between this species and *D. immitis*, so that the *D. immitis* antigen is not specific.

Discussing the prognosis the authors state that usually the acute process subsides after a few days' rest, but patients should not return to full duty for 10–14 days after an acute attack, and longer may be needed if the scrotum is involved. In Samoa the likelihood of recurrence is considerable, but probably there will be no recurrences after the return of the patient to the United States. There is little risk of permanent deformity of the arm or leg, but permanent deformity of the scrotum has been recorded and the prognosis in such cases is more doubtful; the authors think that, if such cases are properly handled, sterility will not occur.

The treatment they recommend is, for the acute attack, rest in bed and reassurance. Sulphonamide drugs have been ineffective. Patients with recurrent or multiple involvement and most of those with scrotal lesions should be taken into hospital. The patient can be assured that the disease is not so serious as malaria or as other diseases which are commoner in the United States, *e.g.*, tuberculosis and rheumatic heart disease, and that he cannot transmit it to his wife or children.

Among preventive measures the authors recommend the wearing of long trousers at all times, the use of bed nets and mosquito repellents and screened quarters. *G. Lapage.*

ROME, H. P. & FOGEL, R. H. **The Psychosomatic Manifestations of Filariasis.** *J. Amer. Med. Ass.* 1943, Dec. 11, v. 123, No. 15, 944–6.

White soldiers, mostly young unmarried men, stationed in the South Pacific Islands, are exposed to an environment which is particularly

apt to cause some anxiety and apprehension with regard to tropical diseases, especially filariasis. DICKSON, HUNTINGTON and EICHHOLD [above] treated 251 cases of acute lymphangitis among the troops, the scrotum being involved in 185; there is, therefore, a real foundation for some apprehension. The soldiers see many cases of elephantiasis among the natives and naturally fear that they may develop similar deformities. Since there is no known remedy for the disease, and as it involves the scrotum in a high proportion of cases, thoughts of the possible effect on their sexual and social life after their return home give rise to much anxiety and mental depression.

The author states that the medical officer is in an ideal position to help; he can honestly give a good prognosis and should discuss the disease frankly with the men in groups and individually, thereby dispelling many false ideas and relieving much of the anxiety.

*J. F. Corson.*

LOEWENTHAL, L. J. A. **Cutaneous Changes in Onchocerciasis.** *Ann. Trop. Med. & Parasit.* 1943, Dec. 31, v. 37, Nos. 3 & 4, 147–8.

GIBBINS and LOEWENTHAL [this *Bulletin*, 1934, v. 31, 399] investigated the association of cutaneous onchocerciasis with the presence of *Simulium damnosum* in certain areas of Uganda. They thought it possible that the skin eruption might be due to the irritation caused by the bites of the flies. In the present paper the author reports two cases of this form of eruption in Uganda natives who were living in places (Egypt and Mombasa respectively) where Simulium did not exist. Larvae of *Onchocerca volvulus* were found in the skin in both patients.

The author states that "this is sufficient to show conclusively that the bites of *S. damnosum* are not the cause of the papular dermatosis." He suggests that the skin may become sensitized to the proteins of the larvae of *O. volvulus* and that the itching results from this.

*J. F. Corson.*

NETTEL, R. Onchocercosis. Vias de invasion del ojo. [**Onchocerciasis. Routes of Invasion of the Eye.**] *Medicina.* Mexico. 1943, Sept. 10, v. 23, No. 443, 368–73, 3 figs.

The author concludes that the most important and frequent route to the eye taken by microfilariae of Onchocerca is by the skin of the eyelids and the palpebral conjunctiva. The microfilariae follow radiating lines from the nodules and become scarcer the further they get from the nodules. A variety of grades of ocular and cutaneous lesions were found in an area intensely infected with onchocerciasis. Cases were found showing: (*a*) nodules furthest from the eye, *e.g.*, on the dorsum of the foot, which showed cutaneous but no ocular symptoms, or ocular symptoms were exceptional; (*b*) a single nodule in the region of the trochanter or iliac crest, in which microfilariae spread to the skin of the abdomen and thorax and were more likely to reach the skin of the face and the eye than were those of group (*a*); (*c*) nodules in the anterior abdominal wall and thorax, in which there was a wide field of travel open to the microfilariae; (*d*) nodules in the neck, in which the microfilariae had a smaller field of travel but could reach the skin of the face in greater numbers; (*e*) nodules in the head and face, which often gave rise to grave lesions of the eye; (*f*) nodules in the temporal, malar

and frontal regions or within the orbit, all of which are very dangerous; (*g*) the possibility of nodules behind the eye which would constitute a grave danger to the eye itself.

A second possible, but hypothetical, route of invasion of the eye is the deep or intraorbital route. Cases occur with severe ocular symptoms in which biopsy of the skin of the face is often negative for some time. Later, microfilariae are found in the skin of the face or eyelids, probably because they reach the face after traversing the orbit. In such cases probably the nodule is deep at the base of the skull and microfilariae pass from it through the spheno-maxillary fissure into the intraorbital fat and coverings of the optic nerve and so to the eye. Such cases are grouped into: (*a*) those in which nodules cannot be found; probably they lie deep; these cases have no extraocular or skin symptoms, but show acute eye symptoms with sudden or progressive amaurosis; biopsy of the skin of the face is negative; (*b*) cases with localizable multiple nodules, acute ocular symptoms and acute or chronic skin symptoms; after removal of the nodules, subjective ocular symptoms cease and some eye lesions, especially those of the cornea, tend to disappear; this suggests that no deep nodules exist; (*c*) cases with multiple localizable nodules and both ocular and extraocular symptoms, but no improvement after removal of the nodules; probably a deeply situated nodule remains.

There is no proof that microfilariae can actually follow this hypothetical intraorbital route. When infection of intraorbital tissue is found, it could have been due to migration from the eyelids or skin of the face; but the existence of intraorbital nodules could be proved by autopsy [*cf.* SEMADENI, this *Bulletin*, 1943, v. 40, 616–7, and TORRES-ESTRADA, *ibid.*, 709–10]. *G. Lapage.*

MAZZOTTI, L., QUINTANAR, Enriqueta & PRIDA, Matilde. Investigación de *Enterobius vermicularis* en 500 niños menores de 3 años y en 500 ancianos de la ciudad de Mexico. [*E. vermicularis* **in Infants and Old People in Mexico City.**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1943, Sept., v. 4, No. 3, 273–7. English summary (6 lines).

## ERRATUM.

In the abstract of the paper by MILLER and ALLEN on the treatment of pinworm infections [this *Bulletin*, 1942, v. 39, 781] the doses for gentian violet were wrongly cited as grams instead of grains. The following should therefore be substituted for the opening sentences of the second paragraph of the abstract:—

" In experiment I, children of 4–6 years had 1 gm. of phenothiazine daily for six consecutive days (6 gm.); those of 7–9 years had the same daily dose for seven days (7 gm.); those of 10–12 years had the same daily dose for eight days (8 gm.). These doses were given to 50 children and were compared with gentian violet given to 48 others, of whom those aged 6–9 years had 1 grain gentian violet daily for 10 days, those aged 10–12 years had 1·5 grains daily for 10 days, the doses being not consecutive, but given in two 5-day periods separated by 1 day free from treatment."

The printers in the original paper used " g." in some instances and " grm." in others for " gram ", and " gr." for grain ". The consequent errors in the abstract provide an example of the confusion that may

arise when somewhat similar contractions are used in the same paper for both the metric system and the apothecaries' system of weights and measures.

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## DEFICIENCY DISEASES.

COCHRANE, E. **The Diet of the Mental Worker in the Tropics.** *Caribbean Med. J.* 1943, v. 5, No. 3, 28–35. [22 refs.]

Many people, living and working in the tropics, experience more lassitude than they do in temperate climates and find mental work more difficult to do. This is usually ascribed to the climate, especially the high temperature and humidity of the air. From experience in Malaya, West Africa, South America and the West Indies the author doubts the truth of this and of the other common explanation, psychological maladjustment or neurasthenia. A vitamin deficiency, especially of the B complex, seemed to be a possible cause and the author made an experiment on 10 persons aged 25–60 years; there were seven men and three women, four were West Indians and six were from the United Kingdom. Their daily work involved considerable mental effort. Seven were given two tablets daily of "Benerva Compound" (Roche) each containing thiamin 1 mgm., riboflavin 1 mgm., and nicotinic acid 15 mgm. while the other three persons took one tablet daily of "Benerva" vitamin $B_1$, containing thiamin 3 mgm. The results were apparently good; nine reported less mental fatigue, six noted alimentary improvement (less dyspepsia and constipation) and four had an increased appetite, while four slept better. Only one, from the United Kingdom and not long resident, noticed no effect.

*J. F. Corson.*

HENDERSON, T. L. C. **Unusual Case of Pellagra.** *Lancet.* 1944, Jan. 1, 17.

The patient, a male inmate of a mental hospital, had congestive heart failure with oedema, severe anaemia and a pigmented rash on the backs of the hands and feet and the elbows; there was a patch resembling rosacea on the nose and cheeks. He was given 50 mgm. nicotinic acid thrice daily and within two days the oedema had disappeared, the patient having passed 10 pints of urine on the first day. The dose was increased, and ascorbic acid and riboflavin were added, and considerable improvement took place, but a few months later the symptoms reappeared and the patient died. At autopsy scirrhus malignant disease of the stomach (leather-bottle type) was found, and it is concluded that this had probably interfered with the absorption of food. The diet on which he had lived in the hospital was adequate. Glossitis and stomatitis were not seen.

*Charles Wilcocks.*

VARMA, L. P. **Mental Symptoms in Pellagra and Nicotinic Acid Deficiency.** *Indian Med. Gaz.* 1943, Nov., v. 78, No. 11, 543–6. [41 refs.]

HARRIS, S. & HARRIS, S., Jr. **Pellagra, Pernicious Anemia and Sprue. Allied Nutritional Diseases.** *Southern Med. J.* 1943, Nov., v. 36, No. 11, 739–47.

This paper contains reiterations of the well-known views of these workers and which have been embodied in their book on pellagra.

These are mainly directed to their thesis that pellagra, pernicious anaemia and sprue constitute distinct and separate diseases. The mouth symptoms and gastrointestinal symptoms in incomplete pellegra, pernicious anaemia and sprue may be indistinguishable from one another, especially in those cases in which macrocytic anaemia is a feature. The most effective treatment in pellagra, pernicious anaemia and sprue is liver or its extracts. In this nicotinic acid may play a part as it is an ingredient of liver extract.

A distinct pathology of the liver, especially fatty degeneration, is common to the group, whilst atrophy of the stomach and intestines is also a feature. When cord changes are found in pellagra, pernicious anaemia or sprue, the lateral and posterior columns are involved. In their opinion liver insufficiency appears to be a factor in the genesis of pellagra, pernicious anaemia and sprue.

A hypothesis is put forward that liver endocrines control erythrocytolysis.

The hypotheses in this paper are illustrated by case reports of pellagra, pellagra with subsequent pernicious anaemia, the coexistence of pellagra, pernicious anaemia and sprue in the same patient—an association which seems to suggest some common aetiological factor. Therefore pellagra, pernicious anaemia and sprue should be regarded as allied, but not identical, nutritional diseases. *P. Manson-Bahr.*

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## SPRUE.

BRAILSFORD, J. F. **The Radiographic Findings in Idiopathic Steatorrhoea.** *Brit. J. Radiology.* 1943, Sept., v. 16, No. 189, 283–5, 7 figs.

Idiopathic steatorrhoea (non-tropical sprue, Gee-Thaysen disease) in adolescents and adults is associated with certain characteristic appearances in the small intestine, in the bones, and with symptoms attributable to hypocalcaemia and avitaminosis. The clinical and radiographic features indicate disturbances in absorption and metabolism of fat and calcium, and the purpose of this communication is to explain the processes which give these radiographic indications.

The appearance and the rate of passage of the meal through the stomach and small intestine vary with the medium in which the barium is suspended. A watery suspension gives a more feathery pattern to the mucous folds of the jejunum than a milk suspension. Furthermore, in infants during the first three months, the picture does not exhibit this feathery appearance as in adults, but a more irregular flocculent pattern. After the age of six months the small intestine exhibits a uniform calibre and characteristic appearance in three segments—duodenum, jejunum and ileum—which merge imperceptibly into one another.

For the radiography of the small intestine in idiopathic steatorrhoea a series of radiographs should be taken in the prone position, commencing immediately after the swallow. With a watery suspension sufficient has soon passed to enable the observer to visualize the greater part of the jejunum. At first the appearances are normal, but within 30 minutes the barium will have gathered into small irregular curds. Some distended coils may show a coarsely serrated periphery, whilst

others show barium in shallow folds. This display of irregularity in tonicity may be associated with more rapid flow than in the normal. Within two hours barium may be seen throughout the whole course of the large intestine, which is dilated as far as the rectum; even though half of the meal is still in the stomach. Much gas may be seen in the large intestine. Haustration of the transverse and descending colon is usual.

These appearances suggest that change in the barium pattern is due to derangement in the innervation of the muscularis mucosae. The appearance bears some resemblance to that seen in the newly-born infant. Improvement in the appearances of the small intestine have been noted after injections of liver extract, administration of nicotinic acid and the vitamin B complex.

As the result of disordered function of the small intestine, the metabolism of fat and calcium is impaired. The bones exhibit radiographic features which are sometimes distinctive, whilst in others suspicion of infantile, renal rickets, or hyperparathyroidism may be aroused. The bones in uncomplicated idiopathic steatorrhoea do not exhibit a compact cortex, though their peripheries are clearly defined. This is distinctive so that the cancellous tissue extends and forms the periphery of the long bones, giving a fine crenated appearance.

The main trabeculae in the long bones run for the most part in the direction of the long axis and appear to be more clearly defined and less closely packed together than normal. The metaphyses at the extremities are of greater depth, the diaphyseal extremity being blurred as in rickets. These features are well shown in the hands and forearm. In the adult general decalcification of the hand-skeleton may be associated with deposition of calcium in the extremities of the terminal phalanges. The skull in the adolescent usually shows a fine stippled osteoporosis, whilst later general decalcification may be associated with multiple ill-defined islands of varying size and density.

The long bones of the extremities eventually are unable to bear the weight of the trunk, and they bend, producing coxa vara and genu valgum. The disorganization and weakening of the metaphyses may lead to displacement of the diaphyses. The vertebral bodies tend to show disk compressions of upper and lower surfaces, so that they tend to become biconcave.

These findings tend to show that the composite picture of the radiographic appearances of idiopathic steatorrhoea has not been appreciated sufficiently by the physician or surgeon in order to impart that broad outlook essential for satisfactory treatment. *P. Manson-Bahr.*

BIRD, J. G. **Tropical Sprue. Review of Literature.** *Bol. Asoc. Med. de Puerto Rico.* 1943, July, v. 35, No. 7, 267–83. [46 refs.]

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## VENOMS AND ANTIVENENES.

WATERMAN, J. A. **Pancreatic Cyst following Scorpion** (*Tityus trinitatis*) **Sting.** *Caribbean Med. J.* 1943, v. 5, No. 3, 136–41.

The author has previously noted that haemorrhage in the pancreas, as well as elsewhere, may be seen at autopsy after death from scorpion

sting in Trinidad [this *Bulletin*, 1939, v. 36, 572]. The case here recorded is that of a Hindu labourer who in 1934 was stung by a scorpion. Soon after this he noticed a small swelling in the upper part of the abdomen. This increased in size and when he was admitted to hospital a cystic mass was observed in the epigastrium, causing dyspnoea. Three pints of a thick dark brown fluid were removed, but the swelling was not appreciably reduced and eight days later, the distress being unrelieved, another 24 pints were withdrawn. After an interval of comparative comfort, some six weeks later another 13 pints of similar dark brown fluid, containing blood cells, rhombic crystals and granular débris, were removed.

A year later the patient was readmitted, having in the interval suffered from " bouts of fever " and the cystic fluid had reaccumulated. Operation revealed a cyst extending up to the fourth rib in the left anterior axillary line, and 17 pints were withdrawn slowly, leaving behind a " muddy " mass of disorganized tissue. The cyst was too large and the adhesions too firm for it to be dissected away, so it was packed and marsupialized. Death occurred three days later.

[The title says " following " which in point of time is true, but whether in the sense of " due to " is not proven, though a haemorrhage such as the author has reported might have caused obstruction of the duct and subsequent cyst formation. The pathologist did not report any signs of cystadenoma but found flattened pancreatic tissue incorporated in the cyst wall.] *H. Harold Scott.*

SAMPAYO, R. R. L. **Toxic Action of** *Latrodectus mactans'* **Bite and its Treatment. Clinical and Experimental Studies.** *Amer. J. Trop. Med.* 1943, Sept., v. 23, No. 5, 537–43. [37 refs.]

When guineapigs are bitten by a *Latrodectus mactans* the following symptoms may be observed: (1) Acute evolution with bronchospasm and intense nervous symptoms ending fatally in 24 hours or less. (2) Initial nervous symptoms with paresis, but little respiratory disturbance; then temporary recovery followed by death later. (3) Recovery after a period of restlessness, excitability, polypnoea and tremors. In a few animals no symptoms are observed. Similar results are produced by subcutaneous injection of half a cephalo-thorax when macerated.

The toxin is 40–80 times as potent as that of *Latrodectus geometricus*. Rats, white mice, dogs, rabbits and toads are far less susceptible to the venom than are guineapigs. The venom is destroyed within 15 minutes by a temperature of 60°C. The eggs of *L. mactans* are venomous and have haemolytic properties. At autopsy guineapigs show pale, enlarged inflated lungs, or, if death is delayed, a reddish marbled appearance with areas of atelectasis; renal and hepatic congestion is present and chromatolysis of the large pyramidal cells.

In the dog the symptoms are mainly gastro-intestinal—nausea, vomiting, diarrhoea—with excitability and tremor, and, post mortem, gastric haemorrhage and rectal petechiae are found.

The effects in man have been admirably detailed by the volunteer patient whose record has been given in this *Bulletin* [1936, v. 33, 401]; the symptoms are very suggestive of some acute abdominal condition, such as ruptured peptic ulcer. The differences are tabulated by the author thus :—

| *Spider-bite* | *Ruptured Peptic Ulcer* |
|---|---|
| *a.* Positive for bite | *a.* Negative for bite |
| *b.* No ulcer history | *b.* Ulcer history |
| *c.* Course of spread from bitten area to abdomen | *c.* Knife-like pain at point of rupture |
| *d.* Mild or no collapse | *d.* Collapse |
| *e.* Temperature normal or slightly elevated | *e.* Temperature subnormal |
| *f.* Pulse slightly faster | *f.* Pulse usually normal |
| *g.* Abdomen rigid | *g.* Abdomen rigid |
| *h.* Cramping of extremities | *h.* No cramps of extremities |
| *i.* X-ray negative for gas bubble | *i.* X-ray evidence of gas bubble in majority of cases |
| *j.* Can sit up or move about | *j.* Remains very quiet. Does not want to be moved |

As regards treatment, local applications and attempts at extirpation are useless, absorption being too rapid. If available, antivenene prepared from horses is given, 10 cc. subcutaneously, or, in very serious cases, intravenously. If this is not obtainable recourse is had to morphine, calcium gluconate (10 cc. of a 10 per cent. solution, intravenously), rest in bed, diuretics, cathartics, hot baths and symptomatic treatment. The prognosis *quoad vitam* is good in man [but Emil BOGEN states that the fatality rate in man is 5 per cent. (See this *Bulletin*, 1937, v. 34, 728).] *H. Harold Scott.*

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## DERMATOLOGY AND FUNGOUS DISEASES.

GANDOLFO, C. F., STEINBERG, Isidoro R., RUGIERO, H. R., DEL PONTE, E., CRIVELLARI, C. & CORIA, J. B. Observaciones sobre posible mal de Pinto en el noroeste santafecino. [**The Possible Existence of Mal del Pinto in North-west Santa Fé.**] *Primer Congr. Nac. Enfermedades Endemo-Epidémicas, Buenos Aires, 1942, Nov. 9–13.* 217–19.

When examining a patient with cutaneous leishmaniasis the authors observed maculae symmetrically distributed. They then examined others working in the Argentine forestry in the same district and found several with these patchy maculae reminiscent of pinta. Questioning these the authors were told that there were several affected like them and they denominated them *overitos* [not a very complimentary term; "overo" is a blossom-coloured horse]. Examination of 2,000 of the workers revealed about 50 cases of the condition and they found in two cases "forms like spirochaetes" and conclude that, by reason of the endemicity of the lesions, in a zone where blood-sucking insects abound, the disease is mal del pinto. [Confirmation should not be difficult to obtain.] *H. Harold Scott.*

MANDOUL, H. & MANDOUL, R. A propos des taches dyschromiques du mal del Pinto. [**The Dyschromic Blotches in Mal del Pinto.**] *Ann. Parasit. Humaine et Comparée.* 1942–1943, v. 19, Nos. 4–5–6, 116–23. [29 refs.]

In the past, when the cause of *mal del pinto* was believed to be mycotic, the various colours, brown, blue, red, etc., were ascribed to

chromogenic moulds. When the cause was found to be a spirochaete the question naturally arose as to how these colourations were produced. An explanation is offered in this article and would seem to be simple and the colours purely physical.

In all the coloured areas only one pigment, a black pigment identical with the normal melanin of the skin, is present. According to South American authors the red colour is due to inflammatory effects and consequent erythema, and the blue to the effect of seeing the melanin through layers of the skin, or, as they expressed it, to the "caerulescence" of the tissues.

The authors compare the colour changes in pinta to those of the sky and of the sunset as due to diffraction by cloudy media (milieux troubles). A more homely example is the reddish tint of cigarette smoke in front of a window and the bluish tint of the smoke when one turns one's back to the light and faces the darker background of the room.

Applying these facts to the colouration of *mal del pinto* the authors state that normally the melanin is in granular form in the basal layers of the epidermis and the cells of Langerhans and in the melanophores of the reticular layer of the dermis. The *brown* areas are caused by increase of pigmentation in the epidermis associated with dermal hypochromia; the *white*, or vitiliginous, areas are due to achromia, from cutaneous atrophy and disappearance of the normal melanin; the *blue* areas result from diminution of the normal pigment in the epidermis and increase in the dermis where it is found accumulated in the melanophores or free in the dermal connective tissue—the melanin being viewed through the "cloudy medium" of the epidermis—or to the sparsely disposed grains in the epidermis viewed over the opaque screen of the deeper pigmented melanin layer (like the blue of a tattooing with the black Chinese ink). Finally, the *red*: the intensity of this depends largely on the degree of erythema and on the blood pigment haemoglobin, but also on the natural colour of the patient's skin. They are, according to LEON and BLANCO, the equivalent in a fair skin of the blue patches in a dark skin, the normal dermal pigment in the former being in separated foci, in the latter in a continuous screen. [A thoughtful and suggestive paper.] *H. Harold Scott.*

McCARTHY, L. **Tropical Mycoses.** *J. Amer. Med. Ass.* 1943, Oct. 23, v. 123, No. 8, 449–54, 1 fig. [27 refs.]

A general account.

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## MISCELLANEOUS.

COLONIAL OFFICE. ADVISORY COMMITTEE ON EDUCATION IN THE COLONIES. **Mass Education in African Society.** Colonial No. 186. 63 pp., 1 fig. 1943. London: H.M. Stationery Office. [1s.]

AIR MINISTRY. **Health Hints for Warm Climates for all Personnel proceeding to the Tropics and Subtropics.** 1st Edition. A. M. Pamphlet 160. D.G.M.S. No. 2. Issued by Authority of the Air Member for Personnel, Air Ministry. 1943, Sept., 24 pp., 25 figs.

This pamphlet is intended for the non-medical members of the Royal Air Force, and contains much valuable advice on the prevention

of disease. It is written in a happy style, lightened by touches of humour, and is illustrated by quaint line drawings which admirably emphasize the points made.

The sections deal with :—preparation of kit ; care of the health when travel is made in transit aircraft (with instructions on the prevention of malaria, dysentery, venereal disease and yellow fever), or on a troop-ship ; general health instructions dealing with water, salt, food, alcohol, clothing, personal hygiene, rest and the dangers of native bazaars ; and general camp sanitation. Notes are given on a dozen of the common, or dangerous, tropical diseases. In these sections the information is generally accurate, with a few exceptions, but many of the points are repeated, unnecessarily, in different parts of the pamphlet. Had repetition been avoided, more information could have been given, with advantage to the reader. For instance, although fly transmission of bacillary dysentery is emphasized more than once, the importance, as a measure of prevention, of washing the hands after visiting the latrine, especially by those who handle food, is not directly mentioned. The uninformed reader would obtain, on page 3, the impression that a single bite by any mosquito may cause malaria. On the same page it is stated that worms in the soil may burrow into the feet and cause ankylostomiasis and bilharziasis. More correct statements are made in later sections, yet such remarks must confuse the reader.

Nevertheless, the pamphlet contains much sound sense and should be useful, especially if it were made the basis of explanatory talks by medical officers. *Charles Wilcocks.*

FISCHER, L. Beitrag zur Kenntnis der Afghanischen Volksheilkunde. [**Medical Folk Lore in Afghanistan.**] *Deut. Tropenmed. Ztschr.* **1943, July 1, v. 47, No. 13/14, 346–54.** [12 refs.]

Owing to its geographical position Afghanistan has been influenced by the cultures of many races. The Greeks brought their doctors, and evidence of their art still exists throughout Central Asia ; later came Arabian, Persian and Indian medicine. The first English doctor arrived a hundred years ago and an Emir appointed an English court physician. The influence of the Indian doctors gradually decreased, an increasing number of European doctors arrived and to-day there is a small medical faculty in Kabul. Modern Afghanistan has given up many of the old practices but medicine is still restricted by old religious laws which obstruct progress, as, for example, by forbidding autopsies and hindering the study of women's diseases.

The people are mostly illiterate and one-third are nomads. Old traditions have been obstinately preserved not only in the mountain villages but also in the cities ; the *hakim* practises in the bazaar and the *mullah* is often called to the patient together with the doctor ; the author has often visited his patients in company with the Mohammedan priest. Modern Afghans firmly believe that demons and ghosts bring sickness and bad luck and seek their aid by sacrificing sheep.

Among the causes of illness vapours are supposed to be especially important—a relic of Greek medicine ; when in the vessels they cause rheumatism, vertigo, headache and other illnesses. Haemorrhoids are another cause of various illnesses affecting the head, body or limbs. Errors of diet are often held to cause not only gastrointestinal troubles but also rheumatism, apoplexy, fever, even gonorrhoea (the name for

which includes cystitis and calculus). Some foods, harmless alone, are said to be injurious when mixed together, *e.g.*, milk and fish. Certain foods and medicines are called "warm" and others "cold"; examples of the former are spices, honey, meat, nuts, leeks, peppers and onions; and morphia and quinine. The author thinks that these ideas had their origin in the four elements of Empedocles, cold, hot, damp and dry [Air, fire, water and earth]. Acid foods like citrons and pickled vegetables are not taken in diseases of the throat and chest, while in fevers such as typhoid fever, the "warm" foods should be avoided. Curdled milk (Yoghurt) is the only food allowed in dysentery; having become convinced of its value the author has always prescribed it. Another form of curdled milk containing salt and leek or cucumber is used as a "cold" food for "warm" fevers. Little can be said about the medicine of the hakim of the bazaar, who carefully preserves the secrets of his art.

Indigenous medicinal plants are numerous but the Government only recently took an interest in them; a French botanist was appointed to collect and study them. Anise, asafoetida, artemisia (santonin), betel, caraway and coriander are used; opium is very much less used than in Persia and addiction is rare. Indian hemp is smoked in the hookah but is prohibited by the Government.

Bloodletting is much practised by all classes; the older people still do venesection in the spring of the year but it is mostly left to the doctor nowadays and many avoid it even when prescribed. Wet and dry cupping are much used, as are cauterization and the Bier type of venous congestion; enemata and purgatives are also very commonly employed.

The country contains mineral springs; some of the waters contain sulphur, others arsenic, others carbonic acid. *J. F. Corson.*

PRESTON, P. G. **Six Years' Maternity Work amongst the Wakikuyu at the Native Hospital, Fort Hall.** *East African Med. J.* 1942, Oct. & Nov., v. 19, Nos. 7 & 8, 223–32; 247–57.

To the question "How is it that African women produce their children so much more easily than the Europeans?" the author replies, "They don't" and in this interesting and well-tabulated account of six years' obstetric work among an East African tribe he describes the prevalence and the nature of abnormalities of labour which he encountered, and discusses briefly their probable causes.

The work described was done over the period 1936 to 1942 at the Native Hospital, Fort Hall, Kenya, where a maternity block had been built on to the hospital. The number of patients increased yearly: whereas in 1936 there were only 15 new ante-natal cases and 39 deliveries, in 1941 there were 408 and 337 respectively.

Among the commoner conditions seen at the ante-natal clinic and requiring treatment, were helminthiasis, malaria, albuminuria and syphilis. Disproportion between pelvis and foetus often necessitated admission to hospital. Of the 1,099 total deliveries over the six-year period, 790 were normal, 309 abnormal, and there were 65 maternal deaths. Live births totalled 929, still-births 190, and neo-natal deaths 47. Of the abnormal labours there were 101 forceps deliveries, 65 episiotomies, 46 Caesarean sections, 31 versions, 28 craniotomies and 15 cases of ruptured uterus.

The author gives figures of pelvic and foetal measurements. He found that the average Kikuyu woman is somewhat diminutive in

height and has a miniature or funnel-shaped pelvis which is liable to cause delayed or obstructed labour. The length and weight of the average Kikuyu child were found to be slightly less than those of the European but the occipito-frontal diameter of the Kikuyu foetal skull is longer and the moulding of the skull correspondingly much more pronounced. Obstructed labour was, therefore, of frequent occurrence and vesico-vaginal fistulae of the mother, and intra-cranial haemorrhage in the child, frequent sequelae.

Malaria was prevalent among mothers; the author considers that "... abortions seem to be common as a result of the patient developing malaria." Ante- and post-partum haemorrhage and eclampsia were rare. Among still-born and new-born infants prematurity and intra-cranial haemorrhage figure largely as causes of death.

The probable effect upon childbearing of such customs as female circumcision and the carrying of heavy loads, which are so usual among the Wakikuyu, is discussed.

The report, with its numerous statistical tables, should be an interesting obstetric and social study for comparison with work of a similar nature in hospitals in other parts of Africa where different conditions as regards diet, environment and social customs are found.

*Mary G. Blacklock.*

GAMBIA. ANN. MED. & SAN. REP. FOR YEAR ENDED 31ST DECEMBER, 1942. Appendix III. 12–14, 2 folding graphs. **Summary of Report on Infantile Mortality in Bathurst by** Dr. D. W. HORN.

From 1916 to 1924 the infant mortality rate in Bathurst averaged about 450. In 1925 a maternity service was started, and the rate declined to 220 in 1931, but rose during the economic depression. In 1934 there was an epidemic of yellow fever, which led to new public health legislation, and the infant mortality rate in 1940 was 134. The rate rose to 243 in 1941, and 240 in 1942. Hospital records show that over 80 per cent. of infant sickness between August and November 1942 was due to malaria, but this was during the malaria season at the end of the rains, and may not be characteristic of the whole year. Malaria has, however, been more prominent in Bathurst recently, partly, no doubt, owing to immigration of non-immunes and to the introduction of foreign strains of malaria parasite. In 1942 malaria caused 36·4 per cent. of all infant deaths, and in 1942 it was rivalled only by the respiratory diseases. The author notes that malaria control is insufficient and that general sanitation is poor; there is overcrowding and defective nutrition.

Tetanus was at one time a formidable problem in infants, but since 1935 the incidence has fallen almost to nothing. This is probably due to the prohibition of cattle in Bathurst and to the better standard of midwifery in the town since the passing of the Public Health Ordinance and Midwives Ordinance in 1935.

*Charles Wilcocks.*

BELL, F. **Acute Meningococcal Septicaemia: a Note on this Disease in Africans.** *East African Med. J.* 1943, Sept., v. 20, No. 9, 314–17, 2 figs. on 1 pl.

This is an account of four cases of fulminating meningococcal septicaemia in African natives, with petechial haemorrhages in skin and

conjunctiva, and clear or faintly opalescent cerebrospinal fluid. There was no neck rigidity. In the first case, which was fatal in 17 hours, meningococci were easily found in blood films, and post mortem the adrenals were found grossly haemorrhagic. In the second and third cases, which were clinically very similar, no macroscopic adrenal haemorrhage was found. The precise pathological basis of the deaths was not elucidated. In all three fatal cases consciousness was retained to the end. The fourth patient, also quite conscious throughout, recovered under sulphapyridine treatment. The pulse, which was very weak and rapid on admission, became normal in rate and volume in four days.

[These cases do not differ materially from acute forms of the disease seen in white people, especially during the early virulent phase of an epidemic.] *H. S. Banks.*

STEPHENSON, R. W. & KIRK, R. **Jaundice of Obscure Origin in El Obeid, Kordofan Province, Sudan.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1943, Dec., v. 37, No. 3, 189–204, 3 figs. on 1 pl. [39 refs.] [Summary appears also in *Bulletin of Hygiene.*]

It is becoming increasingly evident that there are large numbers of cases of jaundice of unknown aetiology in many parts of Africa. The authors have recently been able to study two groups of these in the Sudan and compare them with cases of relapsing fever (with jaundice) and yellow fever, which were occurring at the same time. Observations were made in the town of El Obeid, with a population of about 38,000, where one of the authors had observed a similar group of cases seven years previously.

Those of the present study fall into two distinct clinical groups. The majority occurred in the rainy season and 37 of the 46 patients were aged 20–40 years. There was little or no connexion between cases.

In one group of 18 there were four deaths. These patients showed pyrexia, headache, restlessness, transient albuminuria and a small pointed tongue with clean edges. Jaundice developed 4 to 6 days after the onset and cleared fairly quickly in the mild cases. In only two was there vomiting and none showed any abdominal symptoms; three had an enlarged liver and one a palpable spleen.

In the second group were 28 cases with two deaths. The main symptoms and signs were abdominal discomfort or pain, a large, flabby, thickly coated tongue, enlarged liver, and light or clay-coloured stools. Nausea occurred in some and vomiting in five. The spleen was palpable in twelve. In contrast to the first group, pyrexia was present in only five patients. All laboratory findings were negative. All histological material was obtained by the viscerotome. The lesions in the livers of the four fatal cases from group I resemble in many ways those found in biopsy material from patients suffering from infective hepatitis. Oddly enough, the material from the two cases in group II showed substantially normal liver tissue. *F. O. MacCallum.*

MACQUILLAN, C. J. **Tetanus in Tanganyika Territory.** *East African Med. J.* 1943, Oct., v. 20, No. 10, 323–7.

The mortality rate in 127 cases of tetanus in Africans in Tanganyika Territory who were treated during the years 1935–8 was about 52 per cent., and of 141 treated between 1934 and 1942, 78 (55 per cent.) died.

The great majority of these patients received no antitetanic serum and of those who were treated with serum very few received an adequate dosage. Since the mortality rates reported by most other workers in serum-treated cases have been about the same as these, or higher, the author concludes that the expenditure (£20 per head) for what is regarded as adequate serum treatment is unjustifiable "amongst a primitive people whose annual tax per person is only twelve shillings."

Sulphonamide was used in some cases but appeared to be ineffective. Prophylactic administration of serum and modern methods of cleaning wounds are advocated. Active immunization with toxoid would be suitable for troops and certain other groups of people in Tanganyika Territory but is not practicable for the general population.

[In the case of such a fatal disease as tetanus it may be suggested that treatment provided by Government should not be withheld for reasons of expense associated with the small tax-paying ability of the population. The results and conclusions of PATERSON (*Med. Jl. of Australia*, 1930, v. 1, 832) and YODH (*Brit. Med. J.*, 1932, Sept. 24, 589), and the experiments of SHERRINGTON (*Lancet*, 1917, Dec. 29, 964) and of FIROR (*Arch. Surgery*, 1940, v. 41, 299, reviewed in *Bulletin of War Medicine*, 1941, Jan., No. 3, 181) indicate the need for further investigation; it seems desirable that the opportunities afforded in the Colonial Medical Service should be fully used.] *J. F. Corson.*

BARDHAN, P. N. **Sulphonamides in Undulant Fever.** *Indian Med. Gaz.* 1943, Nov., v. 78, No. 11, 535–7. [13 refs.]

Three cases of undulant fever, all diagnosed by blood culture and agglutination tests, were treated with sulphonamides.

*Case* 1.—Treatment begun on the 18th day of illness; prontosil album [sulphanilamide] 0·5 gm. four-hourly for 48 hours and prontosil rubrum 5 cc. i.m. daily for 3 days. [Perhaps prontosil soluble was given as prontosil rubrum is almost insoluble in water.] Fever subsided on the third day of treatment and "0·5 gm. [prontosil rubrum ?] by mouth, *t.i.d.* was continued for three more days." Fever returned on the 37th day of illness and 0·5 gm. of prontosil album was given four-hourly for 48 hours; the temperature fell, but not to normal, and sulphonamide treatment was discontinued. The patient was discharged on the 69th day free from fever but anaemic and weak; there was no relapse.

*Case* 2.—Treatment begun on the 23rd day of illness; urea sulphazide (a sulphonamide preparation of the Union Drug Co. of Calcutta) 5 cc. i.m. twice daily for 4 days and once daily for 2 more days. The temperature fell to normal on the 26th day of illness, rose slightly from the 35th to the 38th day, but no further injections were given.

*Case* 3.—The day on which treatment was begun is not stated; an initial dose of 2 gm. of sulphanilamide was followed by 1 gm. four-hourly during 4 days to a total of 26 gm. The temperature became normal on the 42nd day but varied between 98·2 and 99·6°F. for another 6 days; sulphanilamide, 0·5 gm. was given four-hourly for 48 hours and the temperature became normal.

The author concludes that the result of Case 1 was indefinite but in Cases 2 and 3 the drug controlled the fever and perhaps prevented relapses; he adds that "success with one case each treated with urea sulphazide and sulphanilamide is too little material to justify conclusions." *J. F. Corson.*

GELFAND, M. **Onyalai.** *Clin. Proc.* Cape Town. 1943, Sept., v. 2, No. 9, 281–6.

A general account of the disease.

DAGGETT, W. I. **Desquamative Otitis Externa.** *Med. Press & Circular.* 1943, Dec. 8, 362–5.

The condition described is an important one for practitioners in warm climates and at the present time particularly, because it is common under war circumstances among those serving in hot damp districts, such as along the Mediterranean littoral. Other names for it are Singapore ear, or "Hot weather ear." Correct diagnosis, early recognition and prompt treatment lead to speedy recovery, whereas wrong diagnosis or failure to apply appropriate treatment owing to missed diagnosis may mean chronicity. It is a diffuse otitis externa, but by no means the only form and it is often dismissed in a few lines in the text books. Under the term diffuse otitis externa are included the subject under discussion, designated aptly by the author "desquamative otitis externa," and also eczema, seborrhoeic dermatitis, dermatitis venenata and otomycosis.

The author describes very clearly the different stages which the desquamative otitis may present—acute, subacute and chronic—though they may overlap and one pass into the other, the acute or subacute into the chronic, or the chronic flare up and become acute. Being most common in the hottest months of the year it has been ascribed to sea-bathing but, says the author, "there is no foundation for this belief, though bathing may be a contributory factor in a few cases."

Since prompt recognition and treatment are essential to speedy cure and text-books rather ignore it, it will be well to give a fairly full abstract of the author's description. In the *acute* form there is discomfort in and around the ear, soon becoming a throbbing pain radiating to the angle of the jaw, and succeeded by a little watery discharge. Owing to narrowing of the meatus and, perhaps, swelling of the periauricular tissues, examination by speculum may be difficult. In a few hours desquamated cells and débris accumulate deep in the meatus. In the *subacute* stage these symptoms are modified, but loss of sleep causes irritability and there may be some degree of cervical adenitis. Débris and pus collect in the deep meatal recess. When *chronic*, the condition causes considerable irritation and the patients may make things worse by probing and scratching with a match-stick; granulations may be seen where the epithelium is lost and the discharge is very offensive.

The organisms concerned are mainly diphtheroids, with which may be associated Proteus, *Ps. pyocyanea* and *Staphylococcus albus*, in this order of frequency.

The first thing in treatment is to remove carefully and as completely as possible all the collected débris and detritus—sometimes a tedious proceeding. For the deep meatal recess it is best to use a fine wool-carrying probe bent to the angle required. It is useless, and wrong, to wait until the swelling subsides before attempting to cleanse the meatus. The somewhat raw surface left after the cleansing is best treated by an astringent applied by means of a "wick of half-inch

ribbon gauze," ear drops are not so satisfactory. Tannic acid 2·5 per cent. solution may be used, but the author prefers the following :—

R

| | |
|---|---|
| Plumbi acetat. | gr. x |
| Burow's solution | ʒ i |
| Aq. menth. pip. | ℥ i |

Burow's solution contains aluminium acetate. The wick is soaked with the fluid twice in 24 hours and a fresh wick is inserted the next day. Usually in 48 hours improvement is such that boric acid powder may be insufflated and the ear left alone. If it does not clear up then, things are left for 3–4 days, except for wiping away discharge, and the above procedure then repeated.

Other applications such as silver nitrate, triple dye, brilliant green, etc., give rise to a coagulum which obscures the process beneath and allows infection to continue. [See also this *Bulletin*, 1943, v. 40, 565.] *H. Harold Scott.*

HARDIKAR, S. W. & RAO, V. G. **Ascites in Hyderabad (Deccan). A Preliminary Note.** *J. Indian Med. Ass.* 1943, Oct., v. 13, No. 1, 1–9, 2 figs.

This is a preliminary note giving a few clarifying facts and asking for information rather than imparting it. As such it is a valuable introduction, for ascites is relatively common in Hyderabad but its cause remains obscure.

At the Osmania Hospital, during the years 1940–41, of 32,364 in-patients, 490 (1·5 per cent.) had ascites. The sexes were equally involved, there being 263 cases among 17,869 males (1·47 per cent.) and 227 among 14,495 females (1·56 per cent.). The authors compare Vizagapatam and Hyderabad with Massachusetts and Bombay hospitals and show that ascites was associated with cardiac insufficiency in 45·4 and 67 per cent. respectively in the latter, but in only 23·3 and 27·5 per cent. in the former. Cirrhosis of the liver, however, accounts for only 10 per cent. in Massachusetts and for 12 per cent. in Bombay, in contrast with 46·3 per cent. in Vizagapatam and 28·5 per cent. in Hyderabad. Delhi more closely approximates the former in both respects, for here 37 per cent. are associated with cardiac insufficiency and 8·9 per cent. with cirrhosis of the liver. Hepatic cirrhosis is commoner in south-eastern India where rice is the staple diet than in the north-western where *jawar* [millet] and wheat are the chief foods. In nearly 20 per cent. (90 of the 490) of the Hyderabad cases no definite cause could be assigned. Pulmonary tuberculosis, anaemia and the dysenteries are not specifically mentioned as causes in Massachusetts, but account for 22·7 per cent. of the Vizagapatam cases and 14 per cent. of those seen in Hyderabad. Of the 90 with unassignable cause 55 were 40 years and over, and 30 between 25 and 40 years ; 44 had oedema also, 25 had ascites without oedema and 21 had "oedema without ascites." [These seem difficult to reconcile with the statement that these were among the "90 cases of ascites without definable cause."] These obscure cases are ascribed to diet deficient in quality and quantity though its mode of operation is not known. Recovery on proper dietetic treatment in hospital is rapid. A few illustrative cases are detailed. *H. Harold Scott.*

HENNESSEY, R. S. F. **A Note on Endotheliomatous Tumours encountered in Uganda.** *East African Med. J.* 1942, Nov., v. 19, No. 8, 236–42.

The well-recognized difficulties of defining the characteristics of an endothelioma are discussed; in his investigation the author decided to reserve the term for "tumours in which the proliferating cells occurred in irregular groups or masses."

Among 477 tumours, examined histologically at the Kampala laboratory during the years 1937 to 1942 inclusive, there were 28 endotheliomata; all occurred in Africans. They arose from the following tissues: skin or subcutaneous tissue (15), subconjunctival tissue (3), nasal mucosa (2), breast (2), bone (2), muscle (1), retrobulbar tissue (1), perineural tissue (1) and 1 not stated. The body areas in which the first tumour appeared were: head (12), leg or foot (8), thorax (3), abdomen (1), arm (1), and 3 not stated.

The author mentions the following points of special interest: many of the tumours showed signs of chronic inflammation; there were 3 cases of Kaposi's "Sarcoma"; only 4 of the tumours showed rapid proliferation; in 17 there were signs of local infiltration, and in 7 the growth was well encapsulated; endothelioma is suggested when there is a smooth, firm nodule or group of nodules, covered by a thin epidermal layer, dark red in colour especially if situated on the lower extremity; if ulcerated it may simulate a squamous carcinoma.

*J. F. Corson.*

CUTKOMP, L. K. **Toxicity of Rotenone to Animals. A Review and Comparison of Responses shown by various Species of Insects, Fishes, Birds, Mammals, etc.** *Soap.* New York. 1943, Oct., v. 19, No. 10, 107, 109, 111, 113, 115, 123, 3 figs. [38 refs.]

A review has been made of the acute toxicity of rotenone to a wide range of animals. Most of the data relate to oral administration and the results are expressed by the median lethal doses in mgm. per gm. of body weight. The relative toxicity of rotenone compared with other orally given insecticides (arsenicals, fluorine compounds, etc.) is shown graphically for four insects, two birds and three mammals. A further figure gives the toxic doses for a number of warm blooded animals by intravenous, intraperitoneal, intramuscular and subcutaneous injections. [These doses are naturally considerably lower than by oral administration.] Finally there is a table of results of immersing various animals in aqueous suspensions of rotenone. In general, differences in resistance to rotenone poisoning were not well correlated with the classification of the various animals, which included worms, molluscs, arthropods, fish and frogs.

[While this is a useful rough guide to the toxicity of rotenone, it must be remembered that the measurements were made by many different workers and that the toxicity of this compound is influenced by its carrier liquid and by the presence or absence of analogous compounds in samples of derris.]

*J. R. Busvine.*

PARR, H. C. M. **The Culicine Mosquitos of Syria and the Lebanon.** *Bull. Entom. Res.* 1943, Dec., v. 34, Pt. 4, 245–51.

NEVES, J. A. & MOTTA, O. C. Sobre cinco casos de coccidiose humana por "Isospora hominis" Fantham 1917, observados em Belo Horizonte. [**Five Cases of Human Coccidium** *Isospora hominis* **Fantham, 1917, observed in Belo Horizonte.**] *Mem. Inst. Biol. Ezequiel Dias.* Belo Horizonte. 1939 & 1940, v. 3 & 4, 79–92, 2 figs. on 1 pl. [17 refs.] English summary.

—— & SOBRINHO, O. P. Sobre um caso di coccidiose humana por "Isospora hominis" em criança. [**One Case of Human Coccidium** *Isospora hominis* **in a Child.**] *Ibid.* 95–104, 3 figs. on 2 pls. [10 refs.]

Both these papers record cases of *Isospora hominis* infections, the first, five cases in adults, and the second, one case in a child six years of age, all of them residents of Belo Horizonte in Minas Geraes, Brazil. The microphotographs illustrating the papers show oöcysts characteristic of this human coccidium. *C. M. Wenyon.*

GUIMARÃES, F. N. Toxoplasmose humana. Maningoencefalomielite toxoplasmica. Ocorrencia em adulto e em recemnascido. [**Human Toxoplasmosis.**] *Acta Med.* Rio de Janeiro. 1943, Aug.–Sept., v. 11, No. 8–9, 127–31. English summary.

After reviewing the published records of cases of human toxoplasmosis, the author gives a short account of two cases which he has encountered in Brazil. One was in a rural labourer 18 years of age. The illness, which terminated fatally, was of 37 days' duration. There was high fever, accompanied by cephalalgia and various pareses. At the autopsy encephalitis, pericarditis, hepatitis, splenitis, nephritis and bronchopneumonia were found. Parasites were free or intracellular, or included in pseudocysts. The second case was in an infant suffering from hydrocephalus from birth. When seen at the age of 14 months, there was hydrocephalus, accompanied by tremors and convulsions. Guineapigs were infected by inoculation with spinal fluid taken before and after the death of the child. The parasites were inoculable to dogs and other laboratory animals, including pigeons, though some of these birds, which had recovered from pigeon toxoplasmosis, were immune. *C. M. Wenyon.*

WEINMAN, D. **Chronic Toxoplasmosis.** *J. Infect. Dis.* 1943, July–Aug., v. 73, No. 1, 85–92, 2 figs. [13 refs.]

The clinical study of toxoplasmosis in man has made it possible to distinguish two main types. The disease in children is an acute or semi-acute encephalitis attended by pronounced neurological symptoms associated sometimes with hydrocephalus and optic involvement. In adults the manifestations are different. Neurological involvement is insignificant, the conspicuous lesions being in the abdominal and thoracic viscera and producing symptoms which vary with the intensity of infection in individual organs. The mortality of these cases is very high, but the diagnosis has in nearly all been made after death. The fact that the infantile form can be acquired congenitally from parents who have been healthy has suggested that in man the infection may exist in a chronic form, causing few or no symptoms. Experiments on animals would appear to support this view. Mice which recover from an acute attack are for some time immune to further

inoculations, but this recovery does not result in complete elimination of the organisms. Later this immunity is lost, and susceptibility to inoculation is regained. In recovered animals the organisms persist in the brain and, inoculated to other mice, prove just as virulent as they did originally. Examination of sections shows that in the acute disease the organisms are scattered in necrotic areas in the brain and other organs. With recovery the necrotic areas tend to disappear, but the organisms persist in pseudocysts in the brain. These pseudocysts, containing large collections of organisms, are the result of cells being distended to such an extent that merely a membrane remains. They cause less tissue damage than the isolated parasites, for generally they are not surrounded by inflammatory cells. The author believes that the occurrence of the congenital infection in the children of healthy parents makes it nearly certain that this chronic type of disease exists in man, though it has not yet been discovered. *C. M. Wenyon.*

WEINMAN, D. **Effects of Gramicidin and Tyrocidine on Pathogenic Protozoa and a Spirochete.** *Proc. Soc. Exper. Biol. & Med.* 1943, Oct., v. 54, No. 1, 38–40.

The two substances, tyrocidine and gramicidin, isolated from cultures of *Bacillus brevis*, the former active against bacteria, regardless of their staining properties, and the latter against Gram-positive organisms only, have been tested by the author against cultures of protozoa and spirochaetes. Tyrocidine in concentrations of 5·0γ per cc. markedly inhibits growth of *Leishmania tropica*, *Trypanosoma cruzi* and *T. lewisi*, but not that of either *Leptospira icterohaemorrhagiae* or *Bartonella bacilliformis*. Gramicidin in concentration of 1·0γ, in conformity with its failure to affect Gram-negative bacteria, had no action on the Gram-negative protozoa, spirochaetes or bartonella. Tyrothricin (which contains both gramicidin and tyrocidine) killed *Trichomonas vaginalis* in cultures, and was effective in bringing about a temporary eradication of the flagellate *in vivo*. When relapse occurred, it was ineffective against the relapse flagellates. It is probable that the effective substance in the tyrothricin was the tyrocidine since "gramicidin is not known to affect flagellates adversely." *C. M. Wenyon.*

TAYLOR, H. L., HENSCHEL, A. F. & KEYS, A. **Cardiovascular Adjustments of Man in Rest and Work during Exposure to Dry Heat.** *Amer. J. Physiol.* 1943, Aug. 1, v. 139, No. 4, 583–91, 4 figs. [14 refs.] [Summary appears also in *Bulletin of Hygiene.*]

Those who are accustomed to high temperatures can do physical work in the heat with better regulation of body temperature than unacclimatized persons. Various workers have shown that a considerable measure of acclimatization is gained after exposure for relatively short periods, but hitherto there has been little evidence as to the rate of acclimatization or as to the detailed mechanisms involved. In planning the investigation described in this paper the authors sought to ascertain: (i) how quickly acclimatization is gained in the first few days of exposure; (ii) how much individuals vary; (iii) whether individual responses to heat can be predicted; and (iv) the sequence of the adjustments involved in establishing acclimatization.

The subjects of the experiments were volunteer soldiers and male university students. All were free from major defects that might have

affected cardiovascular functions. Ages varied from 18 to 46, but most of the subjects were between 20 and 30 years old. The principal data relate to observations made on 43 subjects for an average of nearly 5 days per subject (202 subject-days), and reference is also made to further data gained in experiments on 23 other subjects during 147 subject-days. Thus, the conclusions reached by the authors are based on a substantial mass of data.

Experimental conditions were rigidly controlled. During the hot periods the temperature was maintained at 120°F. dry bulb and 85°F. wet bulb (92°F. effective temperature) by day, while by night the temperatures were 85°F. dry bulb and 65°F. wet bulb (effective temperature, 74°F.). The control period temperature was the same as the night temperature during the hot period. The transition from night to day temperature during the hot period took 2½ hours (110°F. was reached in the first hour); but the evening change was more rapid. There were regular work periods each morning and afternoon; the work consisted of marching on a treadmill at 3¼ miles per hour with an angle of climb of 7½ per cent. (the oxygen consumption incurred by this work was about 7 times the basal rate).

Observations were made of pulse rates when at rest and when working, rectal temperature, rate of sweating, cardiovascular postural adjustment tests, and cold pressor tests. Postural circulatory adjustment was studied by means of the Crampton test in which the pulse and blood pressure responses to elevation on a tilting table are used. The "cold pressor" test required the measurement of pulse and blood pressure before, during, and after a 60-second immersion of the left hand in ice-water. Rate of sweating was measured during specified work periods, and the 24-hour sweat volume was also estimated. Diet was kept constant, and water was allowed *ad lib.*

During the first days in the heat the working pulse rates, rectal temperatures and Crampton scores differed substantially from those observed in the control tests. Improvement in these responses took place rapidly, and was complete in four to five days. Between the fifth and eighth days no significant change in these variables occurred.

It is concluded that the primary adjustment in acclimatization is an improvement in cardiovascular efficiency; a decrease in the accumulation of heat, as indicated by the rectal temperature during work, is probably secondary to this circulatory improvement.

Acclimatization does not appear to affect the daily sweat loss; but the rate of sweating during work tends to increase as acclimatization proceeds. This change in the rate of sweating takes place, to a large extent, after the more important adjustments, indicated by rectal temperature and pulse rate during work, have occurred.

Out of the 66 men studied in this research, 10 suffered heat exhaustion to a degree that required interruption of the work schedule. Four of these were clear-cut cases of heat prostration, with low resting blood pressure, rapid pulse, nausea, vomiting and vertigo. Of these four cases, three occurred on the second day in the heat and one on the third day. All the ten victims recovered without being removed from the heat—rest was sufficient treatment—and all except one resumed the work tests within 24 to 30 hours. Failure of the working pulse rate to show improvement over that of the first day in the heat is a sign of impending heat exhaustion; and poor cardiovascular postural adjustment in the evening is another danger sign.

None of the variables studied in the cooler (control) environment was of use for predicting the ability of individuals to acclimatize on subsequent exposure to heat. *T. Bedford.*

POCHARD, P. Contribution à l'étude des eaux souterraines, des sels et natrons de la région du Tchad. [**The Waters and Salts of the Chad Region.**] *Rev. Sci. Méd. Pharm. et Vét. de l'Afrique Française Libre.* 1943, Mar., v. 2, No. 2, 153–83, 1 folding map & 3 charts. [21 refs.]

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## BOOK REVIEWS.

SOPER, Fred L. & WILSON, D. Bruce. *Anopheles gambiae* **in Brazil 1930 to 1940.** pp. xviii+262. With 5 plates & 75 figs. [Bibliography.] 1943. New York City: The Rockefeller Foundation.

*Anopheles gambiae*, the most versatile carrier of malaria in the world, and indigenous to Africa, was found in Brazil by SHANNON in 1930, having probably been transported from West Africa by ship. Its presence in Brazil was followed, in 1930 and 1931, by sharp outbreaks of malaria, and although the mosquito was apparently eradicated from Natal, its port of entry, in 1931, it obtained a footing in the interior. From then until 1937 *Anopheles gambiae* was spreading, but without causing great trouble, until it reached the Assú and Apodí valleys of the Rio Grande do Norte and the valley of the Jaguaribe, areas favourable to its propagation. In 1938 violent outbreaks of malaria, with high death rates, occurred in these regions, and in 1939 the government, with the active cooperation of the International Health Division of the Rockefeller Foundation, organized a malaria service to cope with this situation. In less than two years *Anopheles gambiae*, so far as could be ascertained by careful and prolonged search, had been eradicated from Brazil, and a major danger to public health had been overcome. In this important, and perhaps epoch-making book, the authors have set out in detail the history of this episode.

The chapters relate to: a description of the mosquito (only the white variety, breeding in sunlit water, was concerned), the region invaded, the early results of invasion, the silent era of 1932–37, the invasion of more favourable regions, the epidemic in the north-east, surveys and control measures, the malaria service, the spread and retreat of *A. gambiae* in 1939–40, the spread and recession of malaria in 1939–41, summaries and special sections, and finally, a most interesting discussion of the entire subject.

The organization found necessary to cope with the situation was very large; in the acknowledgments the names of 69 doctors are given, and at the peak period (second quarter of 1940) almost 4,000 persons were employed in the Malaria Service of the North-East. During 1939, 546,532 persons received treatment; in the following year the number fell to 87,738. The total expenditure rose from $606,000 in 1939 to $991,000 in 1940; by 1942 it had fallen to $116,000.

These figures give an impression of the magnitude of the project, but it will probably nowhere be denied that the result, the elimination

of these disastrous epidemic outbreaks, more than justified the effort. Yet in the early days the conception of complete eradication of *A. gambiae* was not envisaged; it grew as the work proceeded, and it is to the credit of these men, first that great efforts should have been made in a scheme which originally promised to be a measure of partial control only, and second that they conceived and carried out the greater ambition. Species sanitation is an accepted principle in malaria control in countries where the important vectors are indigenous, but the question of species eradication must now be considered. It has been argued that *A. gambiae* found, in Brazil, conditions not so favourable for its propagation as those in Africa, and that this fact no doubt made the work of eradication easier than it would be in Africa; moreover, the invaded area, though large, was limited. These are, no doubt, cogent arguments, but the answer to the question whether eradication is possible in Africa would seem to be that trial of the method, in earnest and on a great scale in some selected region, would decide the matter. What applies to *A. gambiae* in Brazil may, *mutatis mutandis*, apply to other dangerous species in other countries, but it seems to be evident that just as eradication in Brazil demanded effort on an enormous scale, so, in these other countries, failure may follow an effort which is not whole-hearted. These questions are fully discussed.

The authorities in this campaign, confronted by the widespread epidemics, were not prepared to spend overmuch time in close study of biology before beginning the clearance. They studied closely as they went on, but, in the words of the present authors, "it seemed rather more expedient to learn how to get rid of gambiae by actually getting rid of gambiae." The two methods chiefly used were Paris green for the breeding places and insecticides for the adults.

This is a book which should be studied by every health authority in countries where malaria occurs. *Charles Wilcocks.*

RUSSELL, Paul F. [M.D., M.P.H., Lt.-Colonel, Medical Corps, A.U.S.], ROZEBOOM, Lloyd E. [B.S., Sc.D.] & STONE, Alan [B.S., Ph.D.]. **Keys to the Anopheline Mosquitoes of the World. With Notes on their Identification, Distribution, Biology, and Relation to Malaria.** Prepared for the Preventive Medicine Division, Office of the Surgeon General, U.S. Army. 152 pp. With 10 figs. 1943. Sept. 7. Philadelphia: American Entomological Society, Academy of Natural Sciences. [$2·00.]

This book presents keys to the adult females and the fourth stage larvae of the species of Anopheles throughout the world. The names of the authors make the work one of authority and the preface indicates that many other well-known American experts on the systematics of the mosquitoes and on malariology have co-operated in its production.

An introduction of three pages briefly outlines the history of the study of the systematics of the mosquitoes, especially the Anophelini, and concludes with some remarks on the relationship of Anopheles to the actual occurrence of malaria. This introduction is too abreviated to be either a good initiation to the novice or balanced information for the experienced malariologist. There is no information on the subject of nomenclature. This omission is surprising because Chagasia and Bironella appear in the book as genera; the familiar division of Anopheles into the subgenera Sethomyia, Nyssorhynchus, Anopheles

and Myzomyia is not alluded to; and all the well-known "varieties" are raised to subspecific status by the introduction of trinominal names for these forms.

Chapter II, consisting of thirteen pages, deals with Mosquito Identification and is illustrated with ten figures. Notes are given on the important morphological features of the adult female, the fourth stage larva and the egg. The male adult is not considered—not even to the extent of giving positive characters for the identification of that sex, since the authors consider that the characters of the male genitalia "are used to best advantage by specialists." The pupa is not described.

Chapters III to X deal with the Anopheles species approximately grouped according to the usual major zoogeographical regions. The keys are followed by notes which briefly cover the distribution of the species, the biology of both larva and adult and the relationship of the species to the occurrence of malaria. References are given to the original descriptions of the species. The keys, as is to be expected, are all based to a greater or lesser extent on the work of previous authors. In all cases, however, the sources used in the preparation of the individual keys are clearly stated, and some indication is given of the extent to which modifications have been made in making the keys up-to-date.

The first pair of keys, one to the adult females and one to the fourth stage larvae, differentiates the species found in Canada, the United States and Northern Mexico. Both the keys and the subsequent notes "closely follow" SIMMONS & AITKEN [this *Bulletin*, 1943, v. 40, 954].

Chapter IV deals with the species of Central America and the Caribbean region. The authors include Trinidad in this area. The keys are stated to follow ROZEBOOM's mimeographed keys (1942, *A Guide to the Anopheline Mosquitoes of the New World.* Dept. Parasit., Johns Hopkins University, 41 pp.) but KOMP (1941, *Amer. Assoc. Adv. Science, Publ. No. 15*, pp. 88–97, and 1942, *Nat. Inst. Health Bull. No. 179*, ix+195 pp. [this *Bulletin*, 1943, v. 40, 808]) was also consulted.

Rozeboom's keys (1942 *op. cit.*) are also the basis for the keys to the South American species which are the contents of chapter V.

The species of Europe, North Africa and the Near East follow. No complete list is given of the political units included in this area but the subsequent notes on the species show that it extends to and includes Persia and the Caspian region, and it is stated that the shores of the Red Sea are considered to be outside the Palearctic (*i.e.* are Ethiopian). The key to the adult females is based on BUXTON's mimeographed key (1942, *A Key to the Adult Anopheles Mosquitoes of the Mediterranean Region and the Lands adjoining the Red Sea and the Persian Gulf*, London Sch. Hyg. & Trop. Med., London, 6 pp. [see also *Bulletin of War Medicine*, 1942, v. 2, 398]) and MACAN [this *Bulletin*, 1942, v. 39, 810], but in addition there is included a key to the eggs of the species and sub-species of the *maculipennis* complex from BATES & HACKETT [this *Bulletin*, 1940, v. 37, 856]. The key to the larvae is derived from so many sources that it may be regarded as a new one. It may perhaps be remarked here that there is no mention, in the list of references at the end of the book, of MARTINI (1929–31 in LINDNER, Fliegen Pal. Reg., Vol. III, 398 pp.) which is the most recent monographic treatise of the Mosquitoes of the Palearctic region.

South and Central African species follow in chapter VII. The authors have followed EVANS [this *Bulletin*, 1938, v. 35, 930], making certain modifications to bring her keys up-to-date.

The Anopheles of the Oriental region are dealt with in four pairs of keys corresponding to convenient sub-divisions of this region.

Those for Southern Asia (including Afghanistan, Baluchistan, India, Ceylon, Burma and Formosa) are based on CHRISTOPHERS [this *Bulletin*, 1934, v. 31, 74] and PURI (1938, *Health Bull., No. 16, Malaria Bur., No. 7* (3rd ed.) iv+107 pp.). Those for Northern Asia (including the whole of China and Japan) cover an area that is in part Palearctic; they are based on those of CHRISTOPHERS (*op. cit.*) and PURI (*op. cit.*). The third sub-division of the Oriental region is the Malayan region (including Siam, French Indo-China, Malaya, Sumatra, Java and Borneo). The two keys for this region are based on those of GATER [this *Bulletin*, 1934, v. 31, 755; *ibid.*, 1936, v. 33, 497].

The fact that it is now over a decade since Christophers's (*op. cit.*) well-known work on the Indian Anopheles was published and the intimate knowledge of the Oriental anophelines that the senior author of the book under review possesses, are both factors that probably make the above mentioned three keys the most valuable part of the book. They are grouped, together with the relative notes, in Chapter VIII.

Chapter IX contains keys to the Philippine species. They are stated to follow the keys of SIMMONS & AITKEN (1942 *loc. cit.*) which, in respect of the Philippines, were based on the keys of RUSSELL & BAISAS [this *Bulletin*, 1935, v. 32, 753; *ibid.*, 1937, v. 34, 163].

The keys to the species found in the Australian region occupy Chapter X. They are stated to be taken, with some modifications, from mimeographed keys that the authors have received from J. M. MACKERRAS. Authoritative, up-to-date, published keys for this region have been badly wanted for some time and the keys in the book under review should satisfy this want.

The book concludes with a list of the important malaria vectors (2 pages) and a list of references (5 pages). There is an index, to specific and sub-specific names, the page numbers of which lead to the notes on the species, not to the pages on which the species appear in the keys.

There are no illustrations of the details of the characters of the different species but the use of the Mosquito Atlas recently published by ROSS & ROBERTS [this *Bulletin*, 1943, v. 40, 877; and above, 256] should to some extent overcome this want, though it should be noted that while Ross & Roberts illustrate all the North American anophelines they only illustrate the important malaria vectors of the rest of the globe. The fact that both the Atlas and the present book have been published by the American Entomological Society and in very similar styles would indicate that such complementary use was, perhaps, envisaged.

The keys are intended to provide the military malariologist with the means of identifying anophelines wherever he may happen to find himself. They are right up-to-date and neither more nor less complex than the previous keys from which most of them have been derived. Workers whose interests are confined to particular regions will find the keys useful supplements to the standard works such as Christophers (*op. cit.*) and Evans (*op. cit.*). Used in conjunction with these works the new keys will enable the user to have a revised and modernized key to his hand with which to run species down without himself

having to undertake the difficult task of working out modifications of the older keys to accommodate recently described species.

*John Smart.*

PAINE, R. W. **An Introduction to the Mosquitoes of Fiji. Descriptive Notes on the Commoner Species, their Breeding Places and Occurrence ; together with Simplified Keys for distinguishing the Adults and Larvae of Fijian Mosquitoes.** (Second Edition.) *Dept. Agric. Fiji. Bull. No. 22.* 1943. 35 pp. With 3 plates & 1 map. [15 refs.]

The scope of this bulletin is somewhat restricted : it deals with the mosquitoes for their own sakes, the author of the first edition having felt a disinclination to give even cursory notes on their medical importance. For this reason no reference is made to the risk of introduction of *Anopheles punctulatus* and malaria from Melanesia into Fiji, though that is surely a most interesting and important matter, and one on which the intelligent reader ought to be well informed.

As the total number of species of mosquitoes is limited (17 are recorded) the author felt that the intelligent reader could learn to identify all or nearly all of them, in the adult stage ; and that he could use this knowledge to find breeding places, and mitigate the nuisance. With this in view simple keys and (almost too simple) figures are provided.

The notes on breeding places, especially of the commoner species, are full and interesting. A point of particular interest is the establishment of *Megarhinus splendens* in Fiji : this is a harmless " elephant mosquito," of which the larva is predacious on other mosquito larvae, including those of *Aëdes scutellaris*, in company with which it is found in tree holes. The Megarhinus was deliberately introduced into Fiji from Java in 1931 and 1932, to control the Aëdes, and is now widely established, though it spreads extremely slowly unless it is deliberately carried about.

[The present edition of this Bulletin differs little from the first : it has been prepared by Mr. R. J. A. W. LEVER, the Entomologist to the Department of Agriculture, Fiji, though his name does not appear on the title page.]

*P. A. Buxton.*

SMART, John [Ph.D., Assistant Keeper in the Department of Entomology]. **A Handbook for the Identification of Insects of Medical Importance. With Chapters on Fleas,** by Dr. Karl JORDAN, F.R.S., **and on Arachnids** by R. J. WHITTICK, B.Sc., Assistant Keeper in the Department of Zoology.—pp. x+269. With 13 plates (3 coloured) & 178 figs. 1943. Oct. 22. London : British Museum (Natural History). [15*s*.]

The literature concerned with insects which have been proved to be injurious to the health of mankind is vast, and is scattered through periodicals written in many languages ; but the number of text-books in English dealing with medical entomology as a whole is not large—indeed it is surprisingly small when considered in relation to the importance of the subject. Yet amongst this small number it is difficult to select a volume suitable to the requirements of the newly appointed medical officer about to proceed abroad, who, at the end of his course in tropical medicine, invariably asks his instructor " What is a good

book to take with me for identifying insects and other creatures of medical importance? It must not be too bulky to take on trek, and it must be simple enough for the ordinary medical man to understand." Up to the present there appeared to be no really satisfactory answer to that inquiry. "Entomology for Medical Officers," ALCOCK's classic work, is out of print, and in any case is not sufficiently detailed for the requirements of present-day needs. "PATTON and EVANS," those impressive and valuable "Debretts" of the world of medical entomology, are too cumbersome for easy carriage. REILLY and JOHANNSEN is excellent and almost fills the need, but so many of its closely printed pages are devoted to those aspects of tropical medicine and hygiene already dealt with in the text-books possessed by the medical officer that insufficient space is left for systematic entomology.

To meet this need, and particularly the need of the large number of R.A.M.C. officers proceeding abroad, the Trustees of the British Museum have published this handbook. Like most of its predecessors (although Patton and Evans avoid the difficulty with the somewhat awkward title of "Insects, Ticks, Mites and Venomous Animals of Medical Importance"), it deals with many arthropods in addition to the Insecta, and the reader wonders why the title "Arthropods of Medical Importance" has not been preferred.

To compress such a wide field into some 270 not too closely printed pages, no fewer than 156 of which are illustrated with diagrams, must have been a difficult task, but the authors have accomplished it by confining themselves to those arthropods of medical importance which occur in the old world, and by avoiding any undue encroachment into the fields of medicine and hygiene.

It might be thought that this determination to direct the student's footsteps along the rather dry and dusty high-roads of systematic entomology, and to discourage wanderings into the more attractive by-paths of medicine, would have resulted in the production of a mere primer of identification, "where index-learning turns the student pale, yet holds the eel of science by the tail." With less enlightened writers this might well have been the result, but Dr. Smart and his colleagues are men of wide experience and the result of their combined efforts is a crisply written volume that any medical man, armed with the experience gained from attending a course in tropical medicine, can follow with enjoyment, even when the text leads him into such subjects as classification and nomenclature.

The first eight pages are devoted to the structure, development and life-history of insects; these are followed by six pages giving an admirable account of the methods of classification usually adopted, together with a short note on zoogeography. Of the remaining 250 pages, 175 deal with the Diptera, 100 pages being reserved for the mosquitoes, most of the information being arranged in the form of keys for the indentification of the larval and adult forms, with a useful list of their more usual breeding-places. The remaining insects, with the exception of the fleas, are dismissed in a short chapter of 10 pages. Since lice and bugs are included in this, it is obviously too brief for any full account of their bionomics, but, as the work is intended only to enable the medical officer to identify the specimens submitted, it is sufficient for its purpose. The account of the insects is completed by Dr. Jordan's chapter of 20 pages devoted to the Siphonaptera. The Arachnida and Pentastomida, etc., are described by Mr. Whittick in the remaining 35 pages. Not the least important part of the book

is the appendix, in which well-tried methods for collecting and preserving insects are described.

The reviewer has only one serious criticism to offer. The index is quite inadequate to the scope of the work, particularly when it is remembered that the majority of the users will be unacquainted with many of the scientific terms employed.

That a book so well produced and so magnificently illustrated (there are no less than 178 text-figures and 13 plates, three of them in colour) can be produced in this country in war-time is highly gratifying, and the price of 15*s*. is surprisingly low.

Dr. Smart and his collaborators are to be congratulated on having written a text-book which supplies a long-felt want and which will prove invaluable to all medical men serving their country overseas.

*R. M. Gordon.*

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